

FIGURE 1A

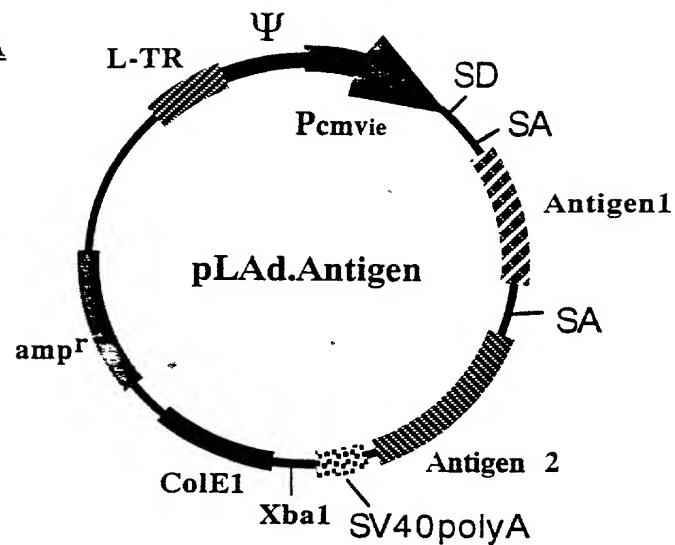


FIGURE 1B

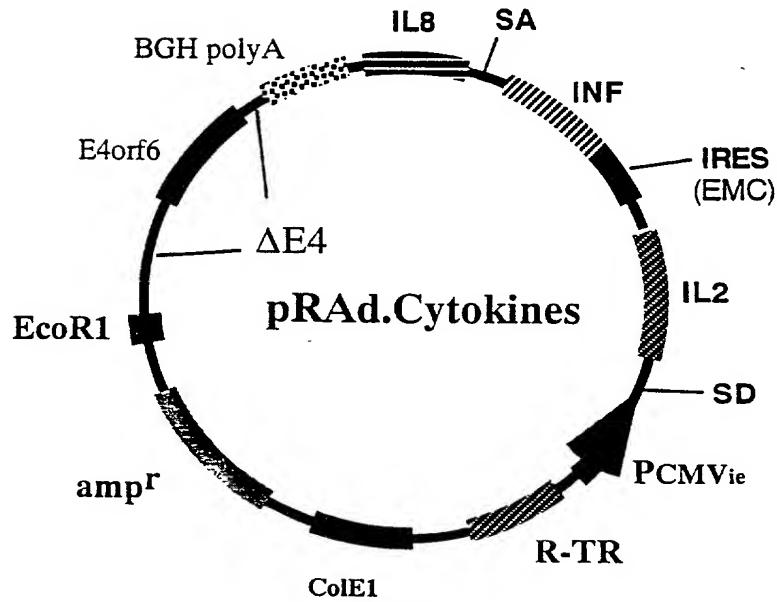


FIGURE 1C

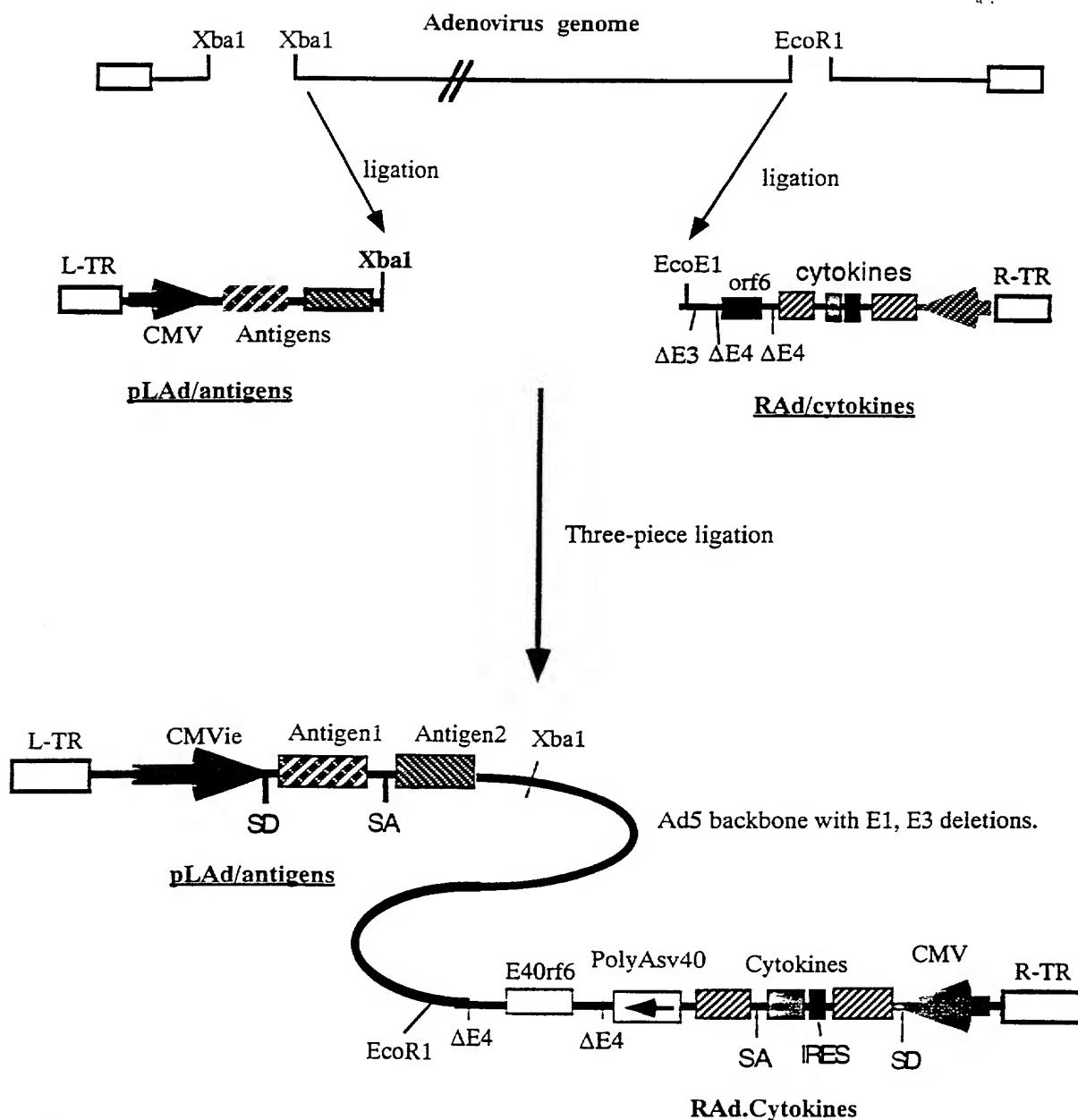
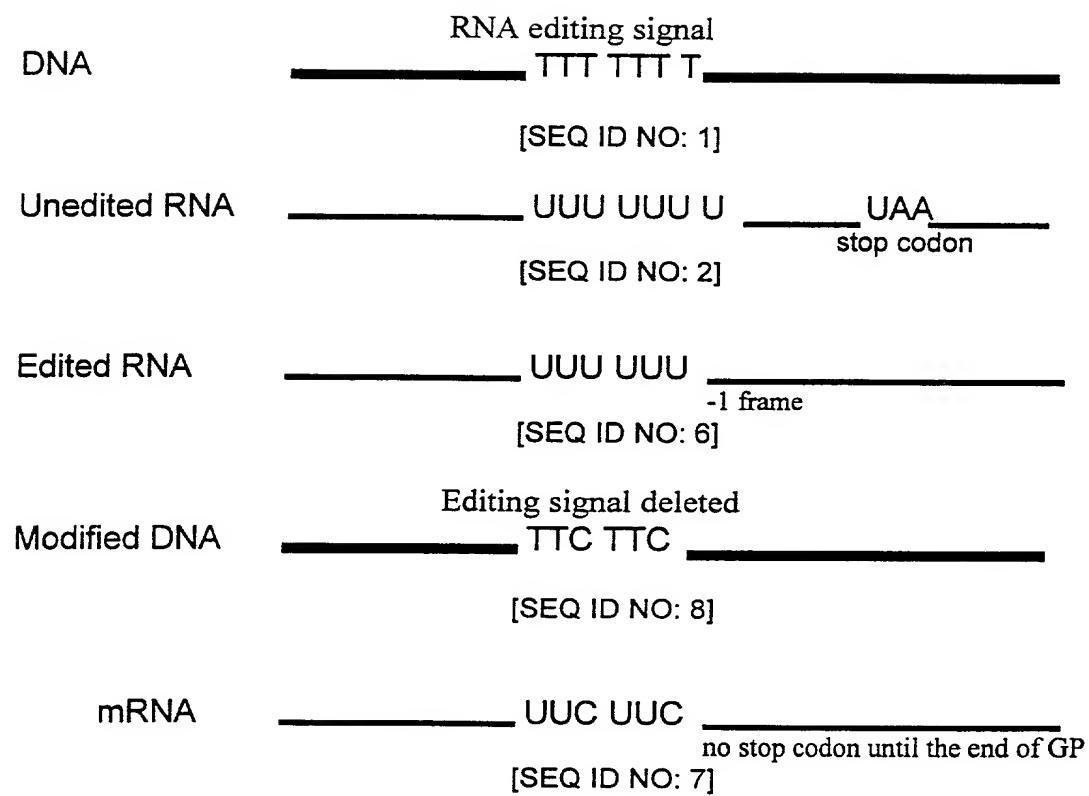


FIGURE 2



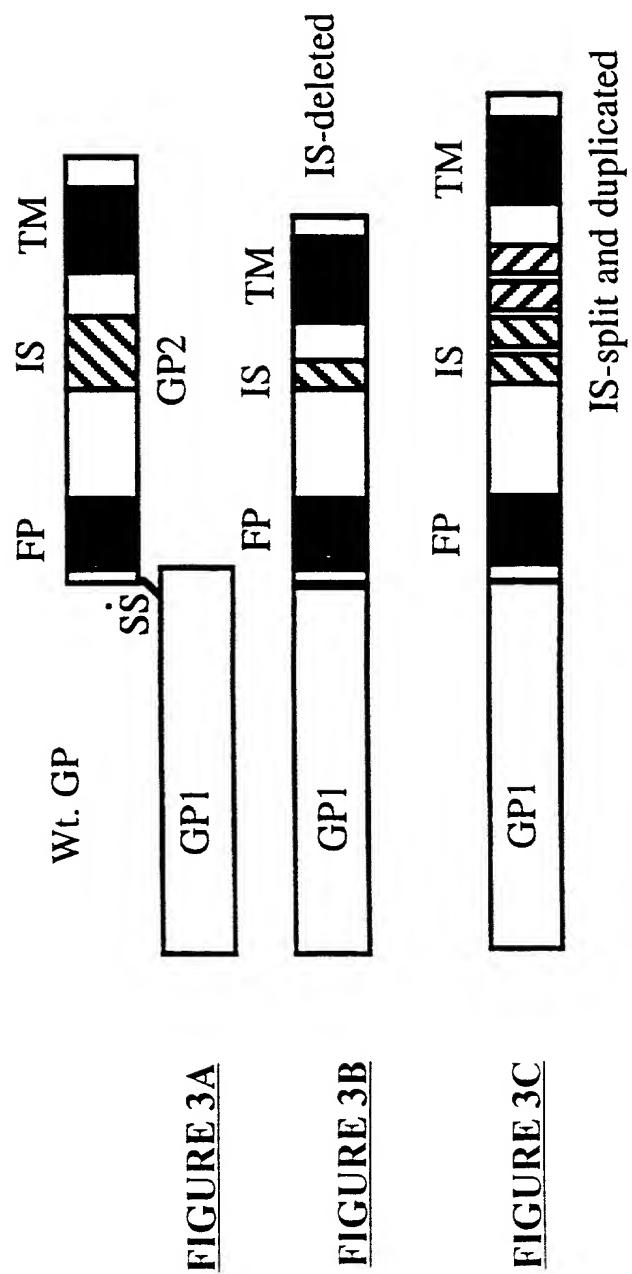


FIGURE 4A

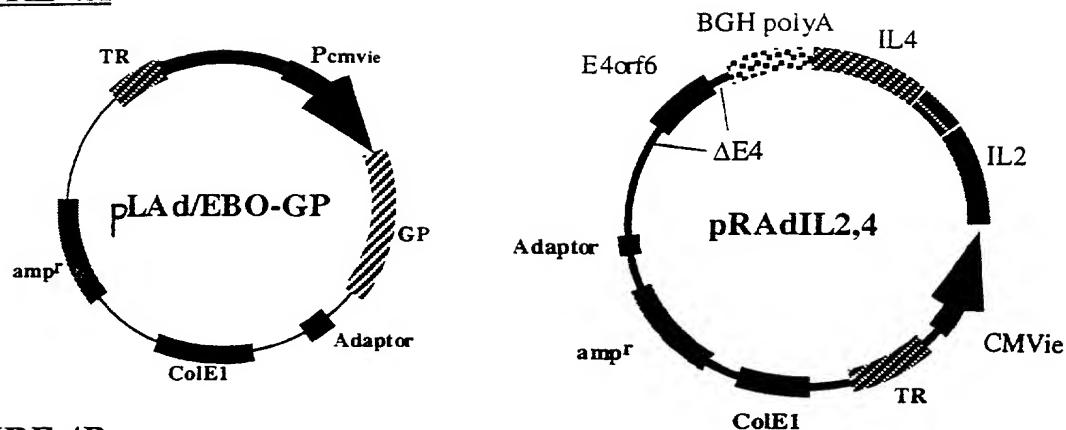


FIGURE 4B

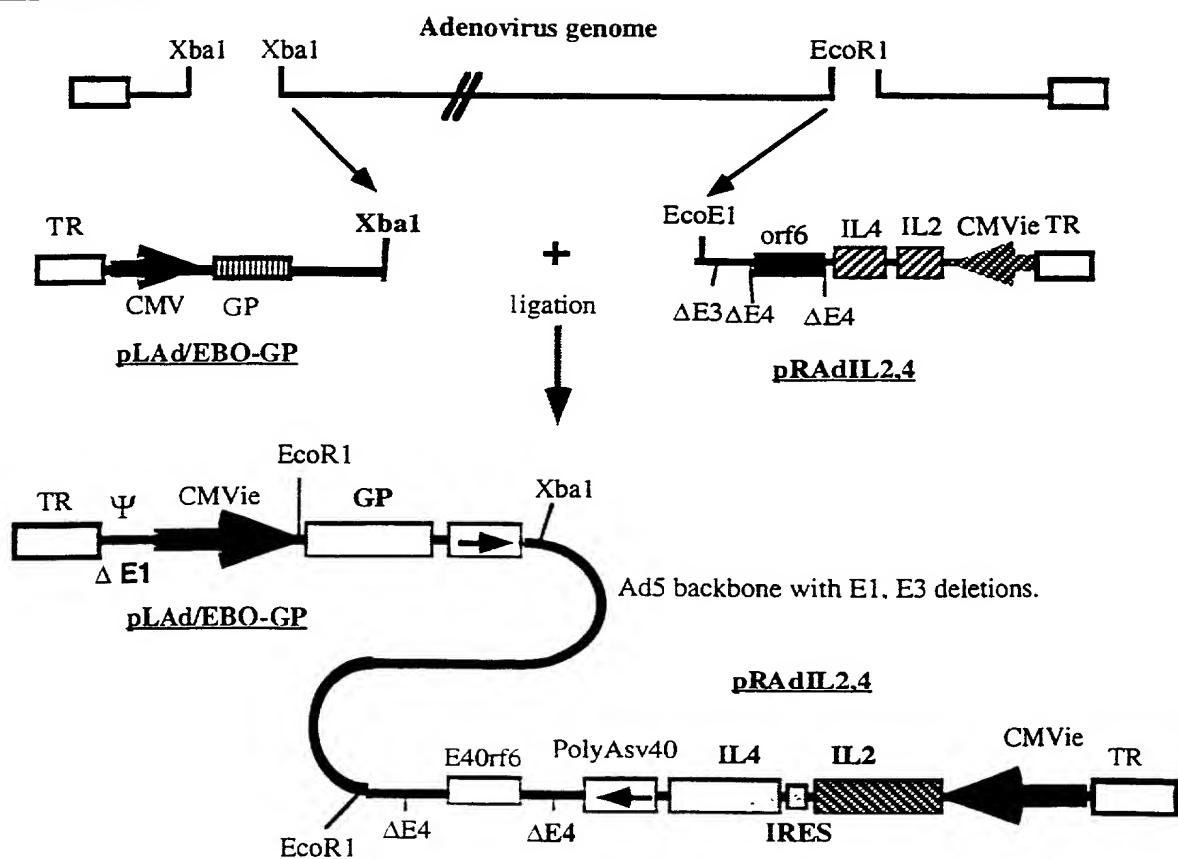
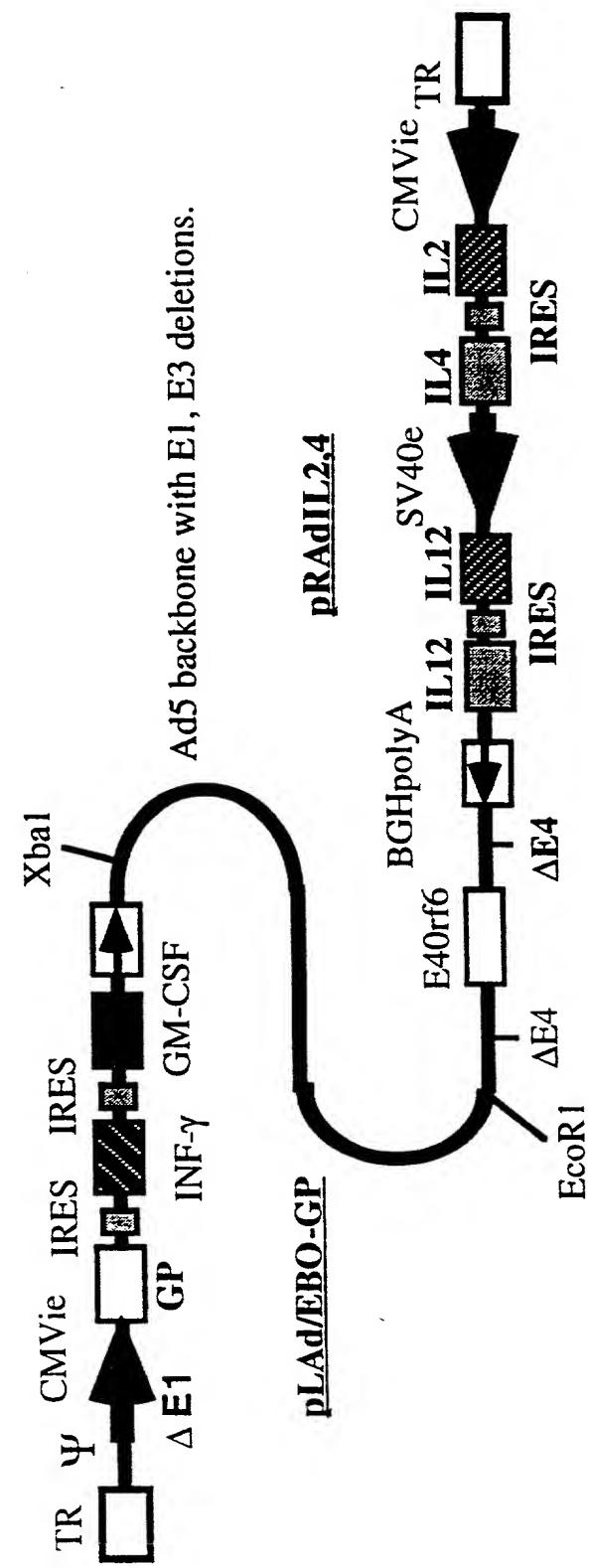


FIGURE 5



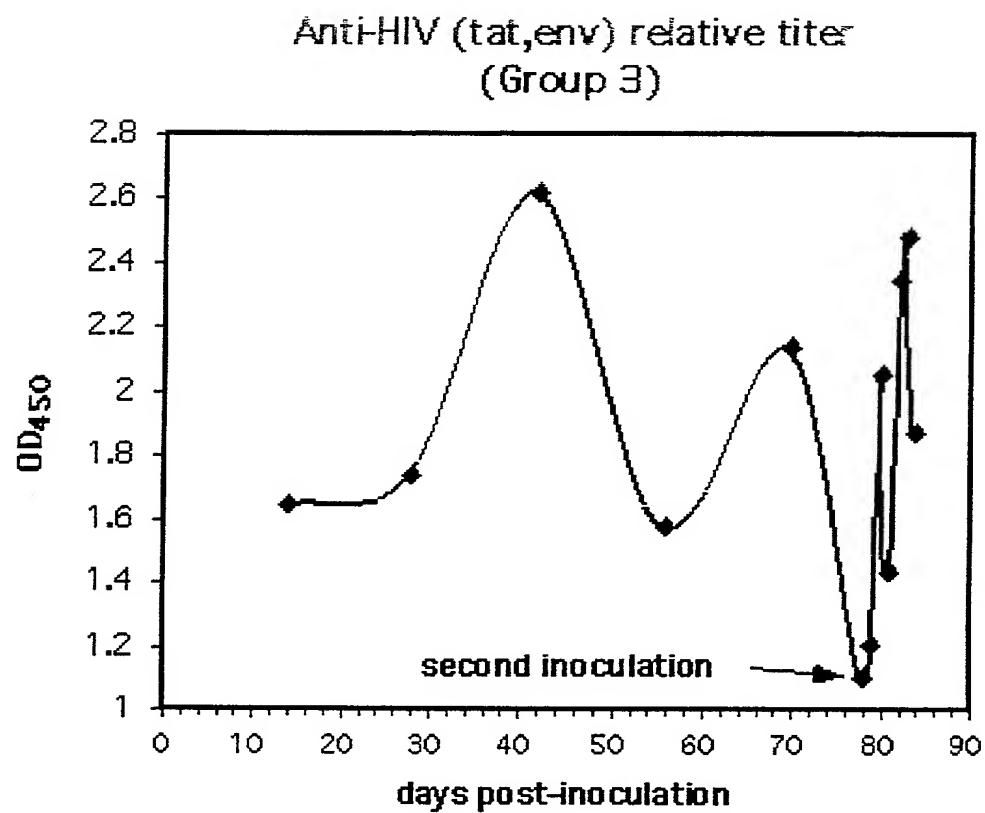


FIGURE 6

Anti-HIV (tat,env) relative titer
(Group 4)

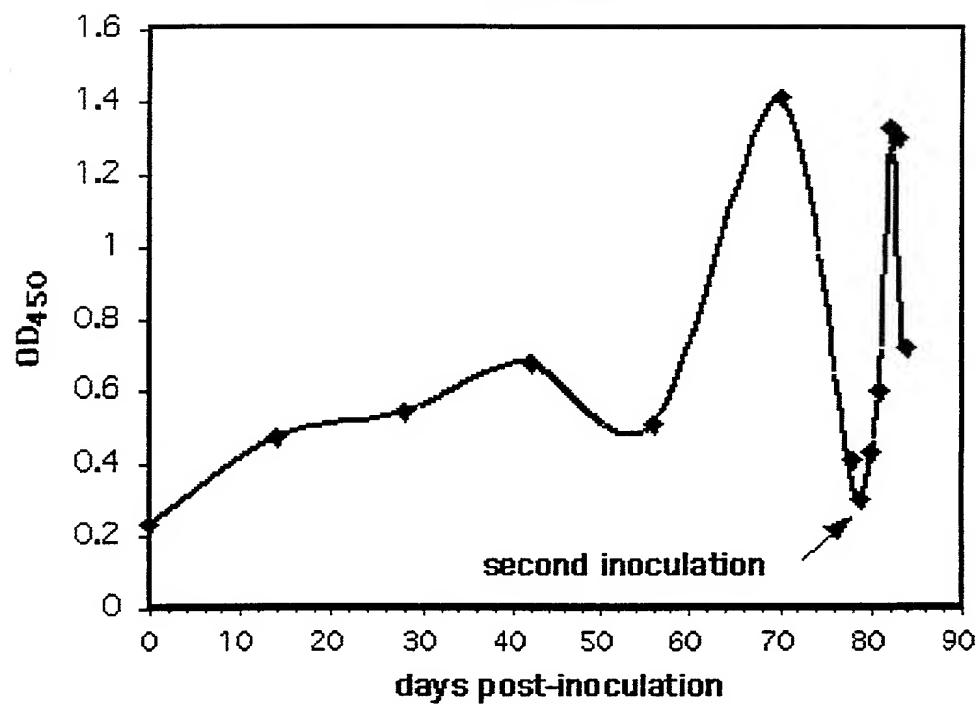


FIGURE 7

IFN γ secretion from activated splenocytes in response to target cell stimulation

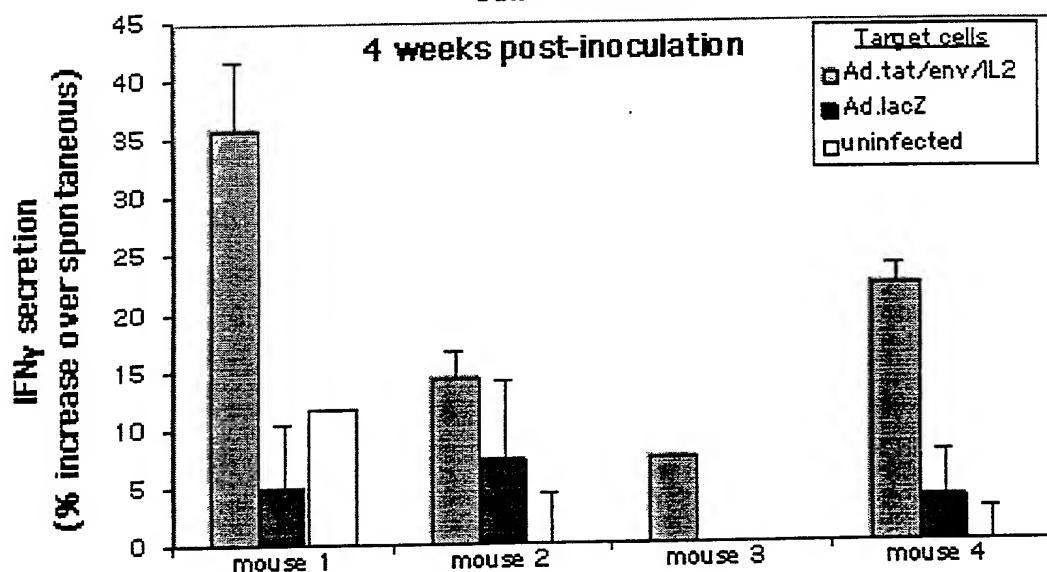


FIGURE 8A

IFN γ secretion from activated splenocytes in response to target cell stimulation

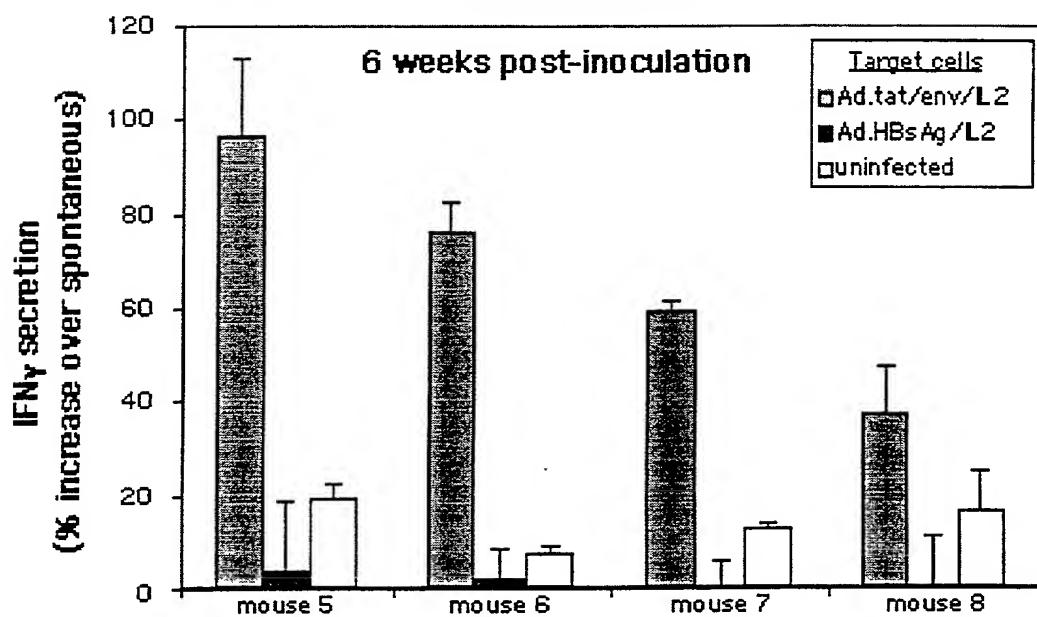


FIGURE 8B

IFN γ secretion from activated splenocytes in response to target cell stimulation

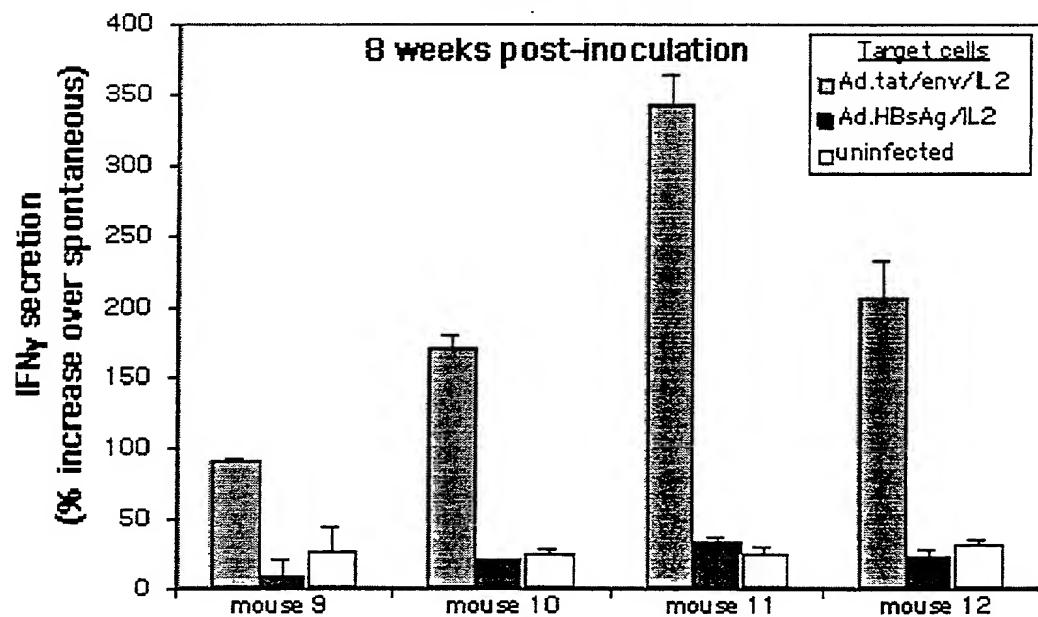


FIGURE 8C

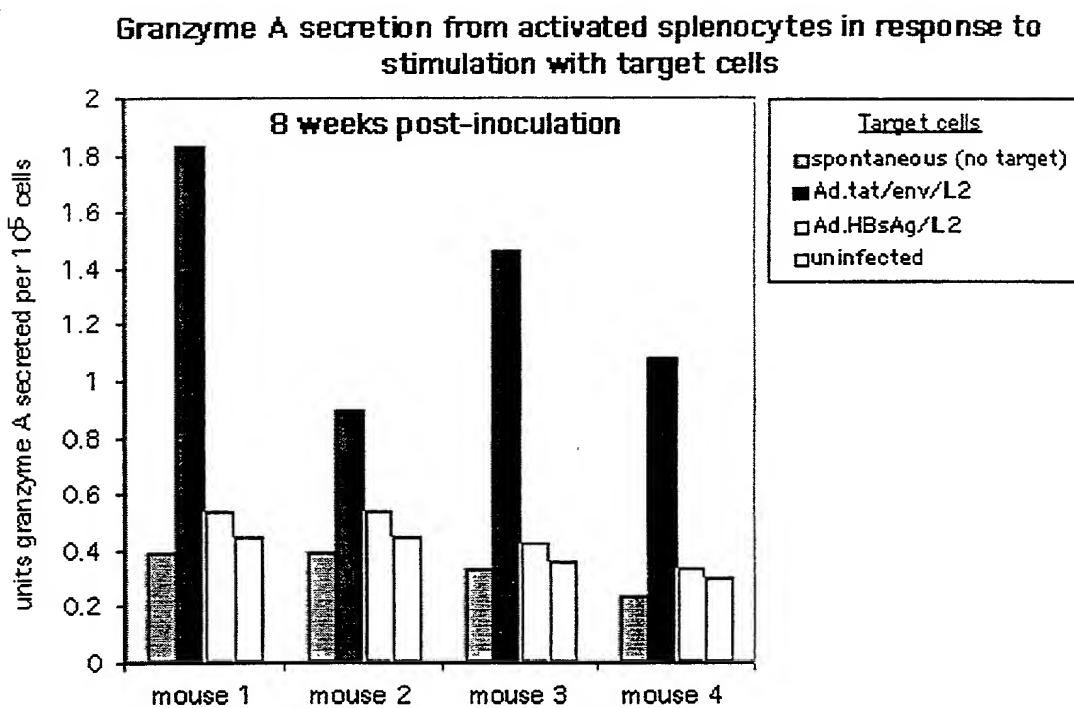


FIGURE 9

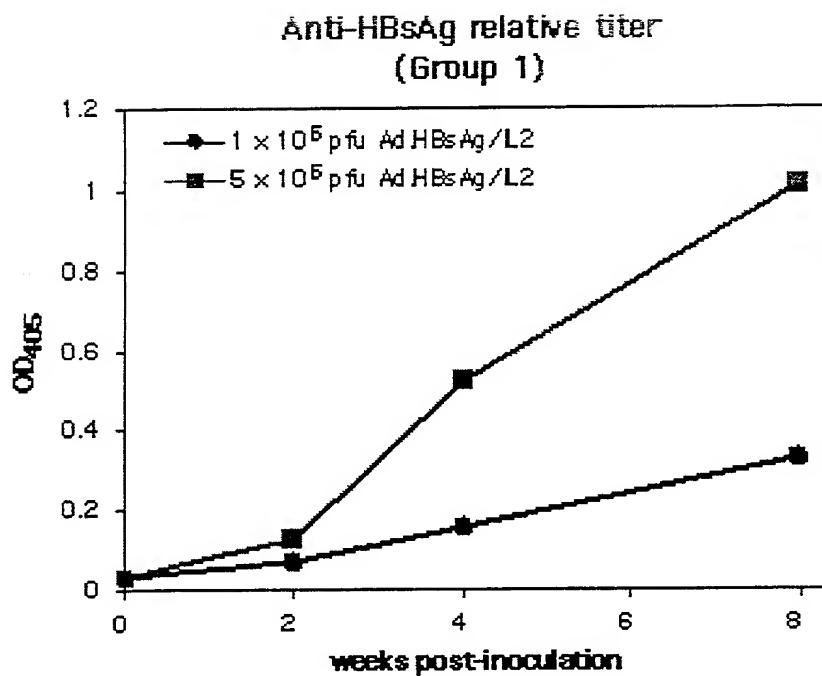


FIGURE 10A

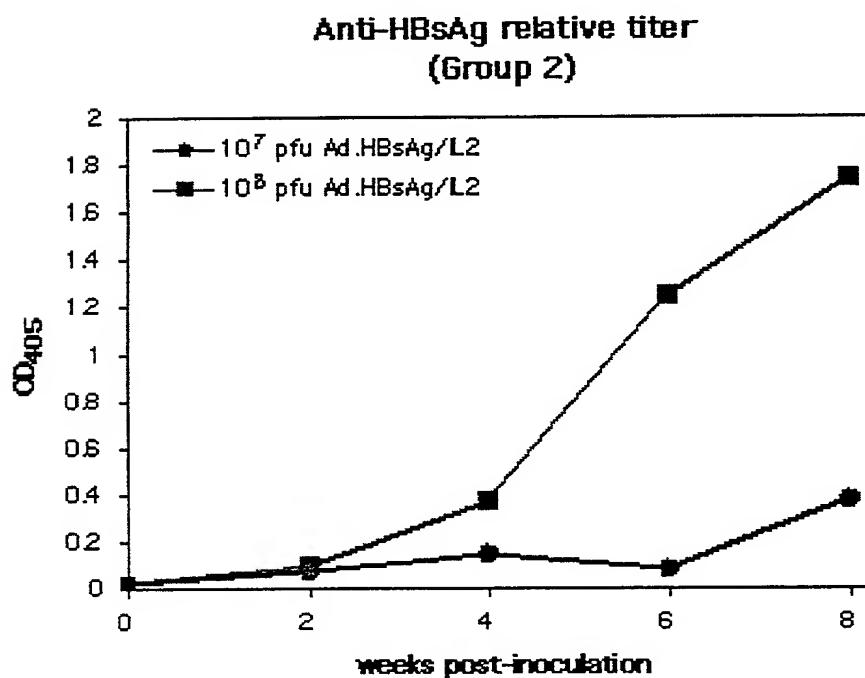


FIGURE 10B

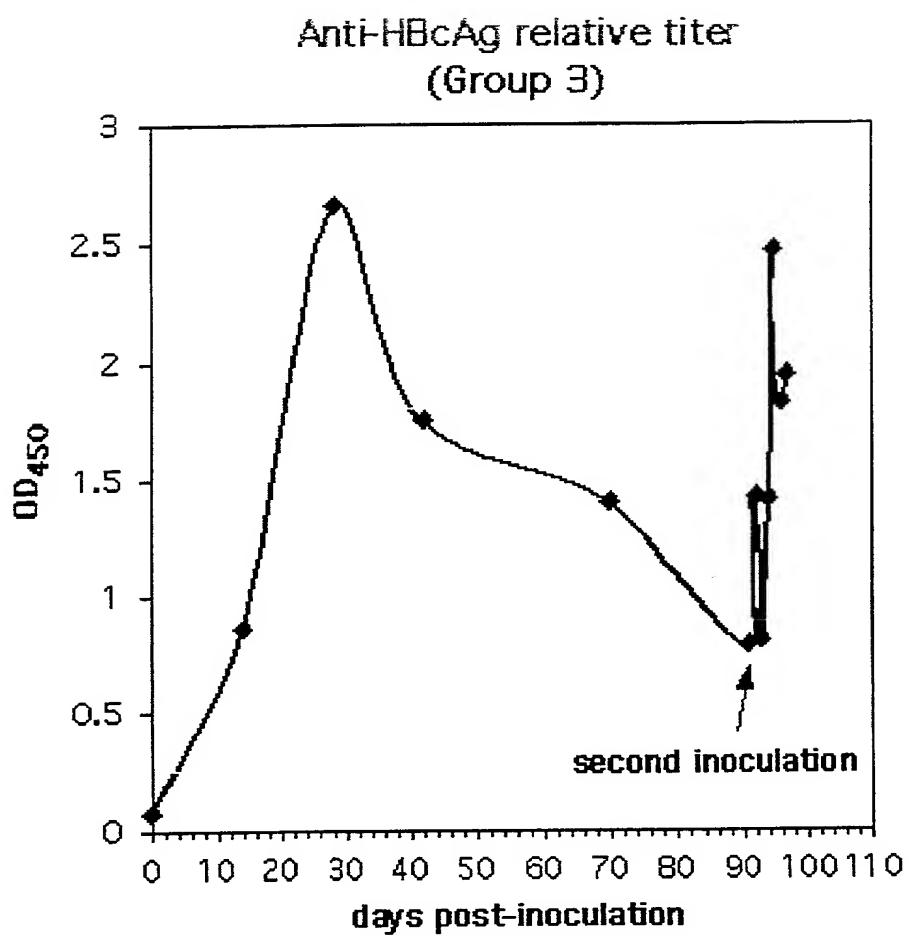


FIGURE 11A

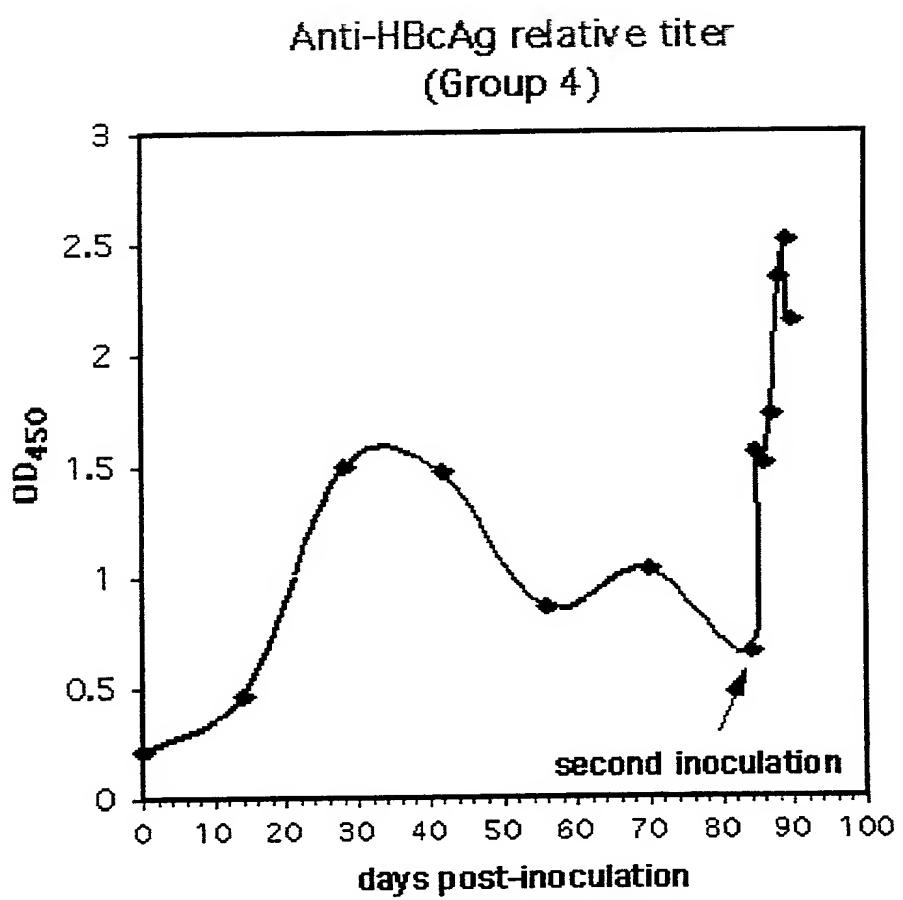


FIGURE 11B

FIGURE 12

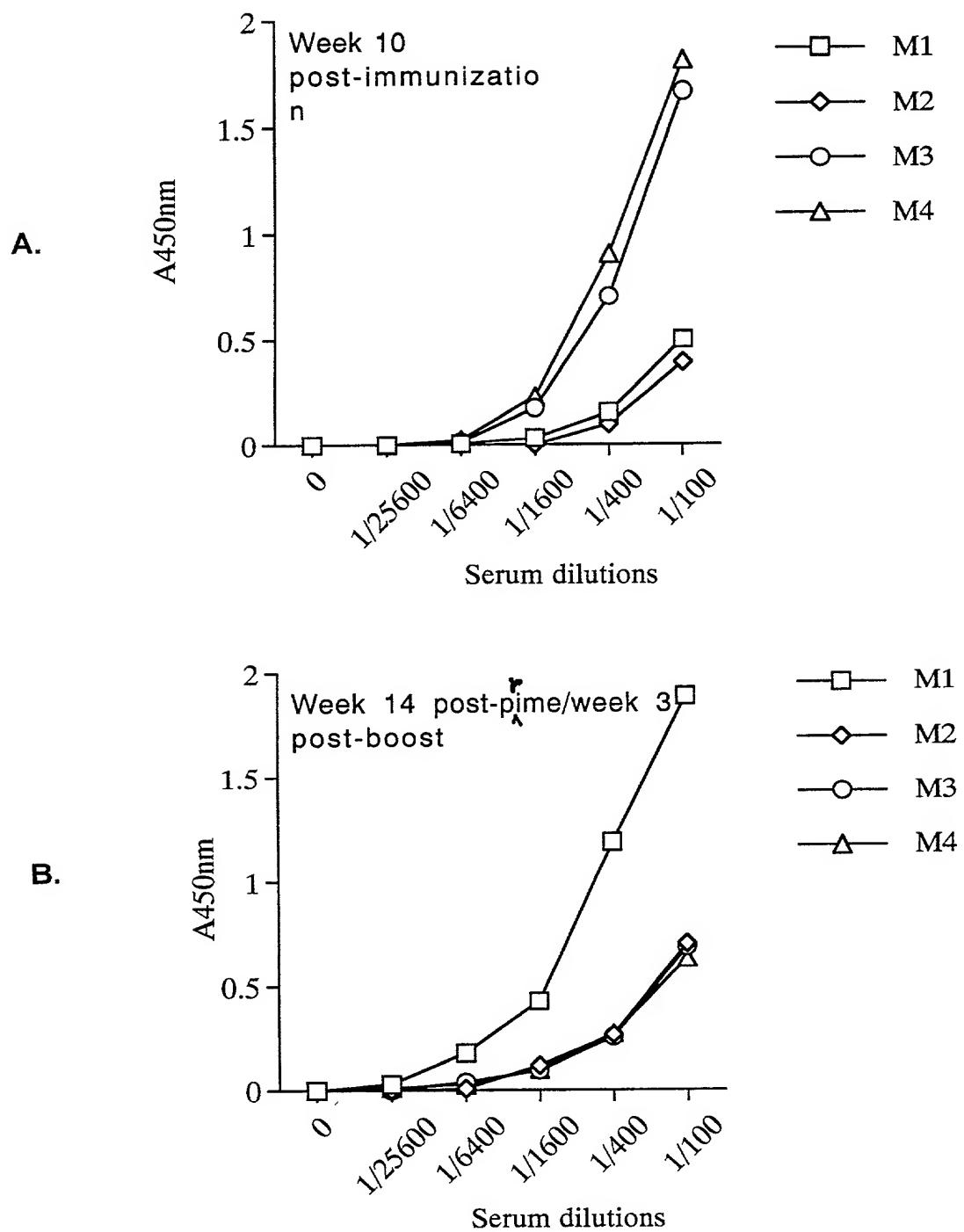


FIGURE 13

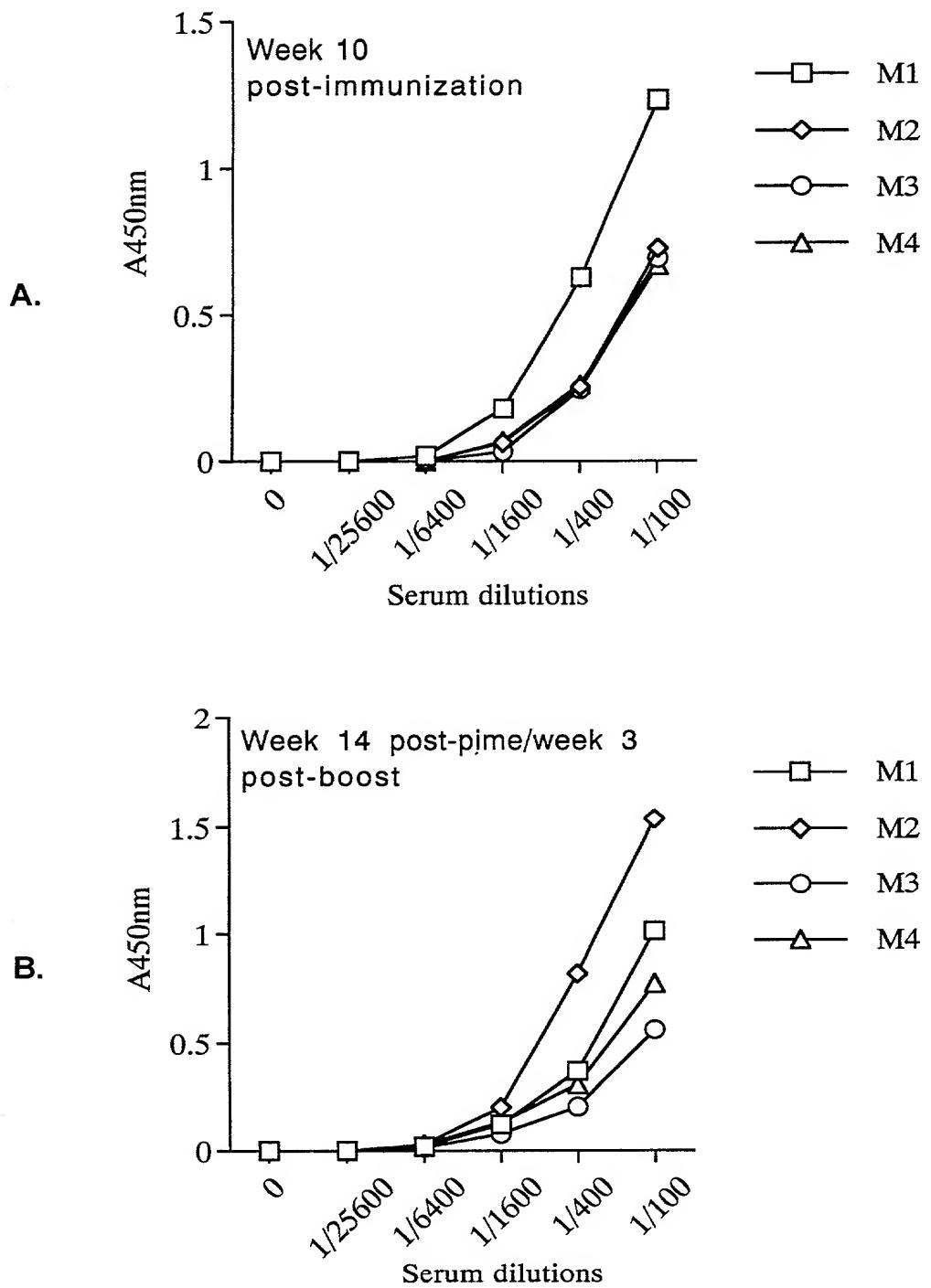
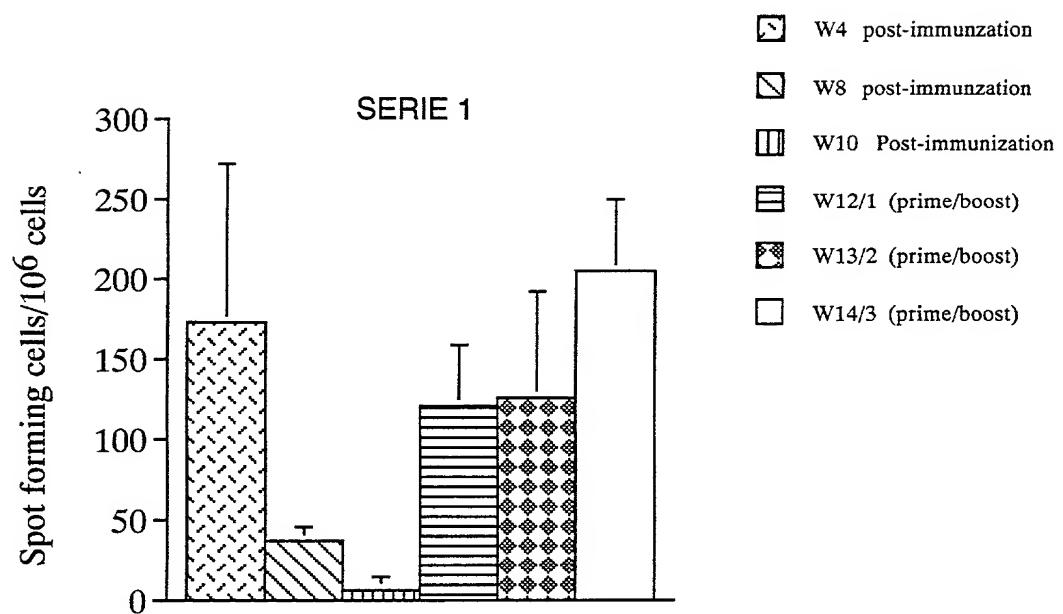


FIGURE 14

Gag-specific IFN γ secreting splenic cells
after immunization of mice with Ad(3C,
Gag, Env)

A.



B.

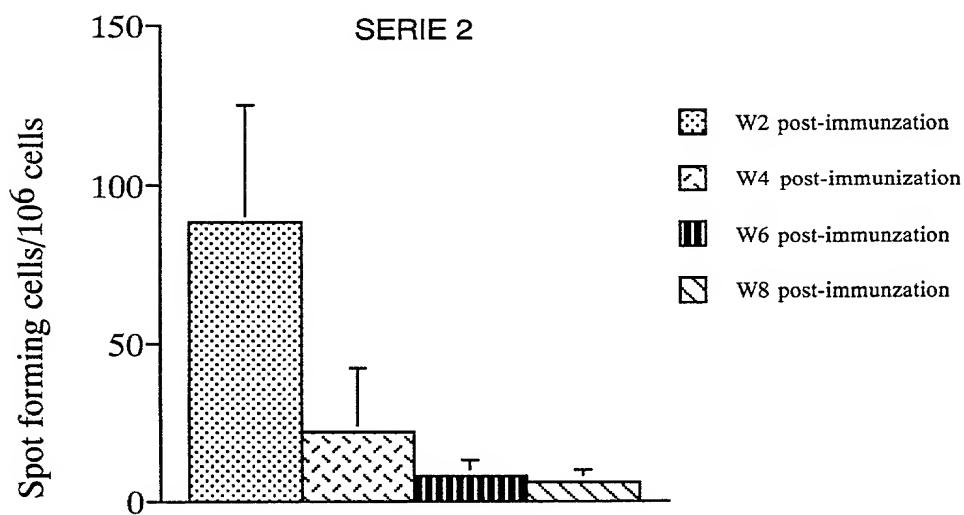


FIGURE 15

L23: ELISPOT for IFN γ secretion: Serie1 spleen cells
from mice at week W13/2 (post-prime/boost)

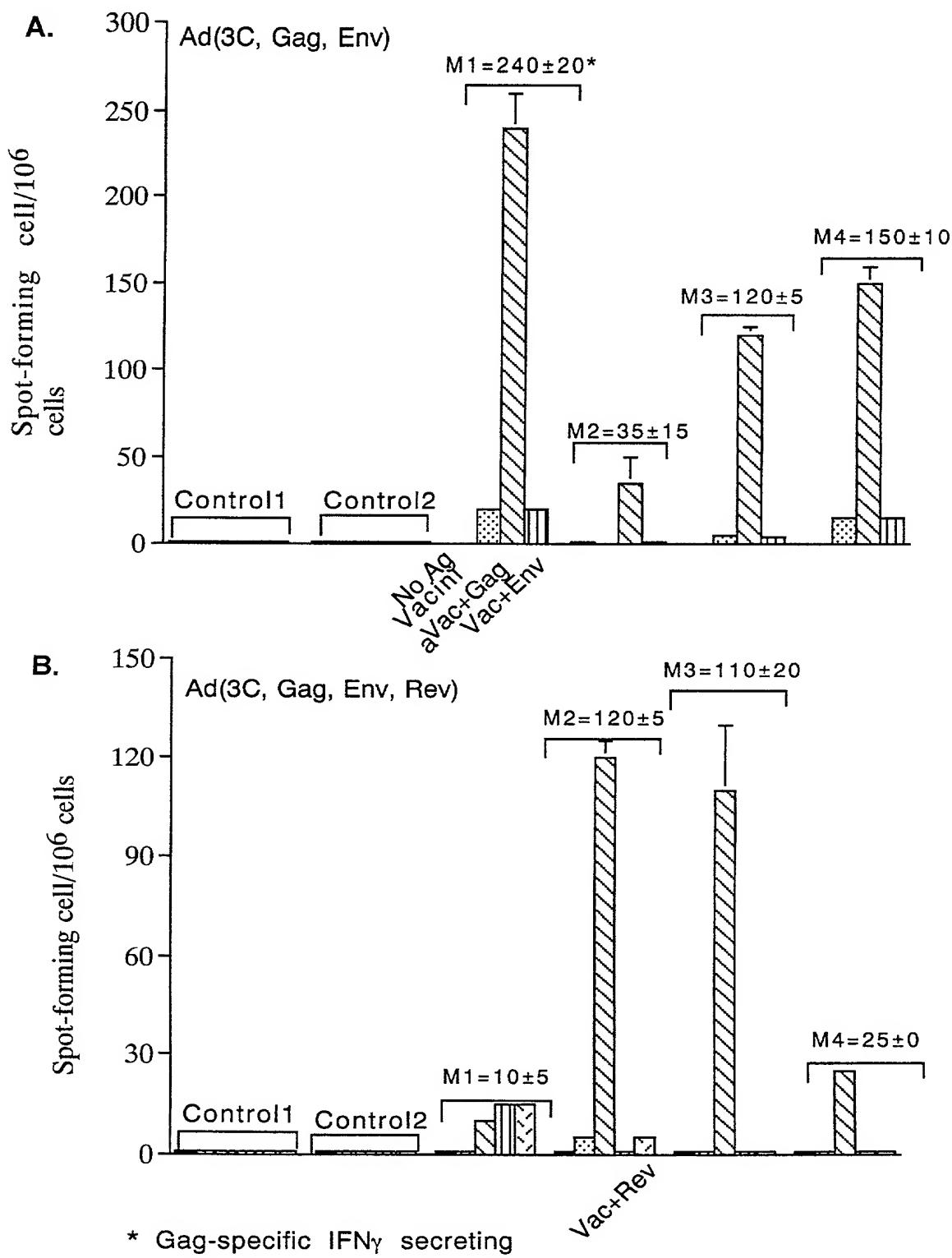
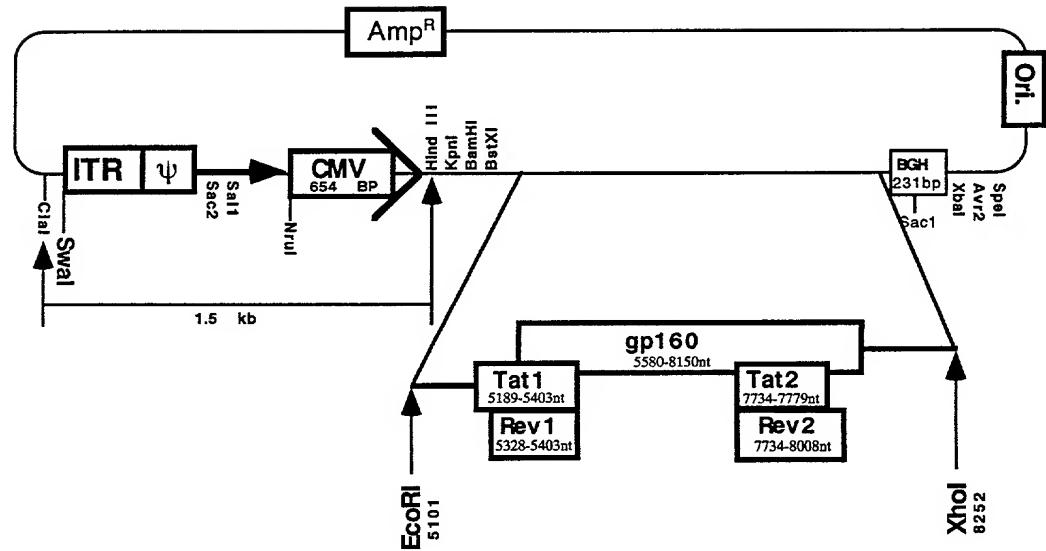


FIGURE 16 Ad-E.T.R/IL2 (from BH10 strain)

A. pLAd-E.T.R



B. pRAd.ORF6-IL2

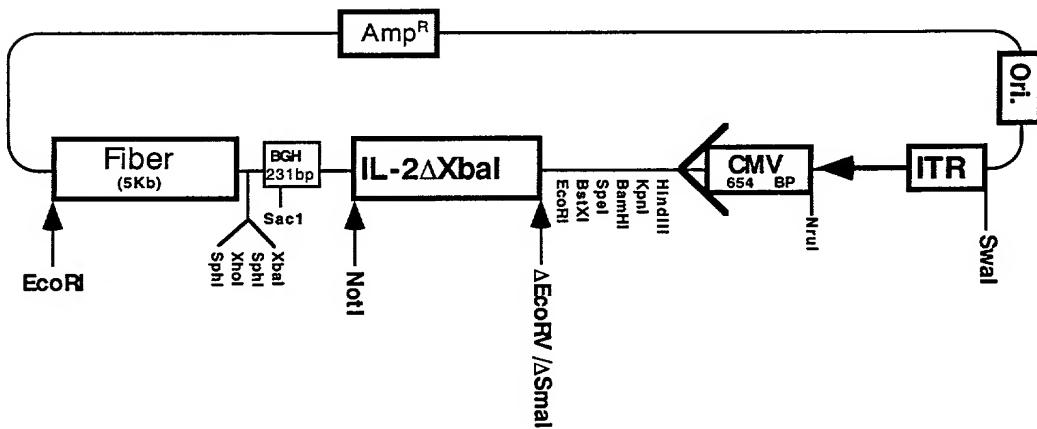
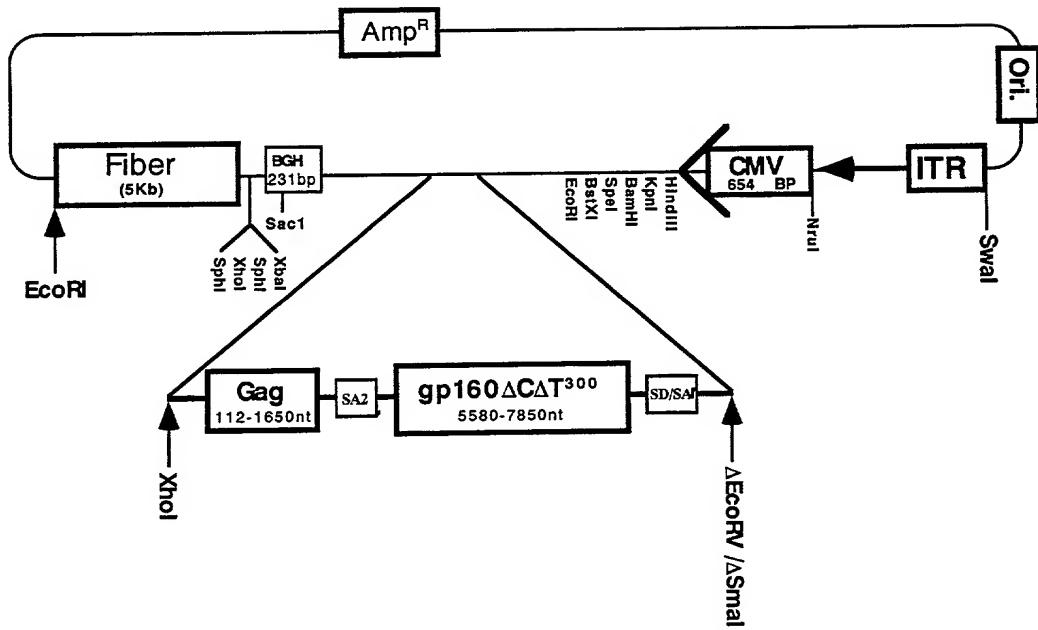


FIGURE 17 Ad-3C/E^mΔCΔT³⁰⁰-G (from BH10 strain)

A. pRAd.ORF6-E^mΔCΔT³⁰⁰-G



B. pLAd-3C

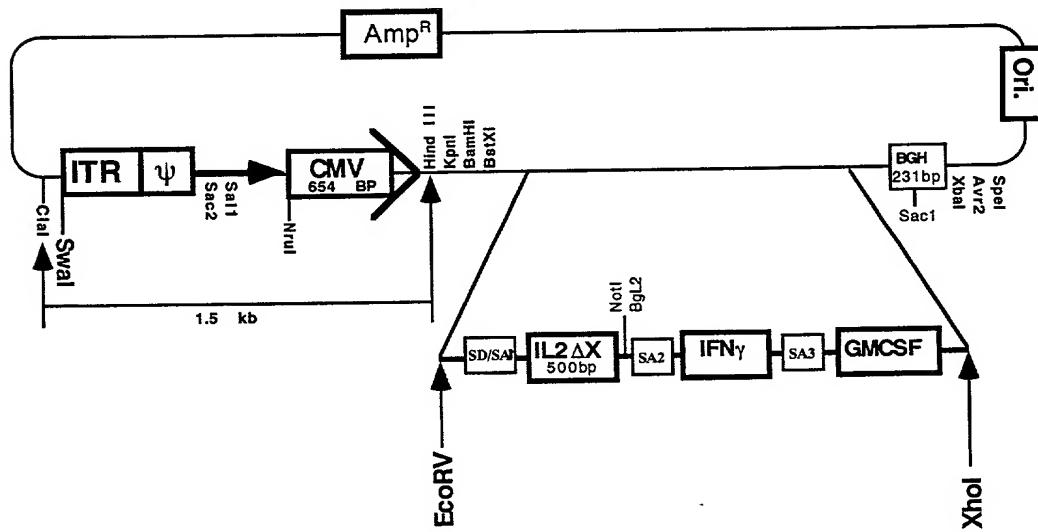


FIGURE 18

pRAd.ORF6-E^mΔCAT⁹⁹.T.R-G

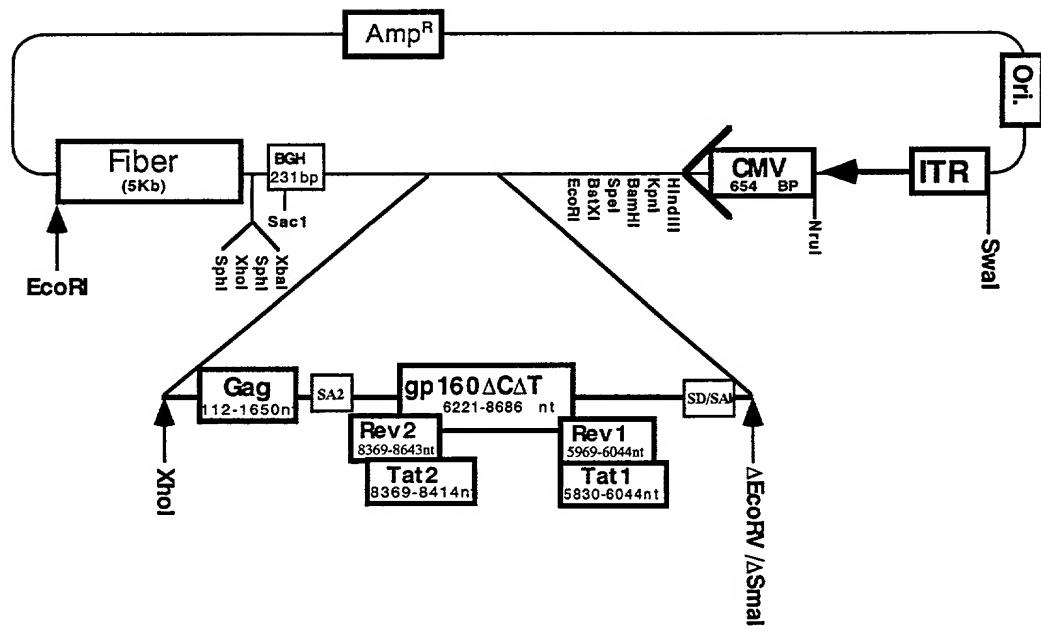
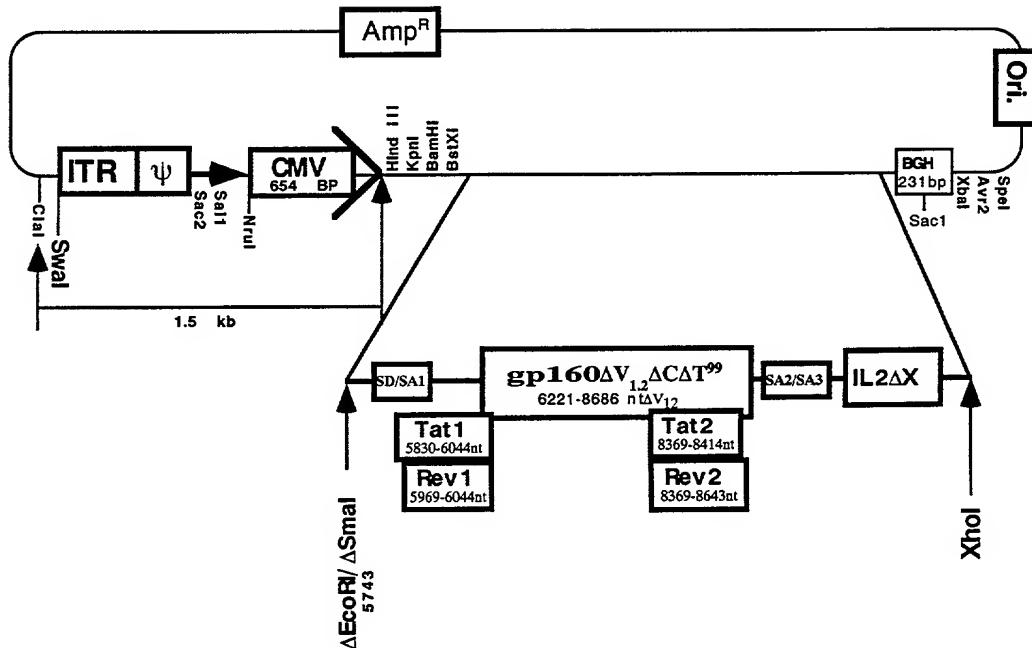


FIGURE 19

A. pLAd-E^mΔV_{1,2}ΔCAT.T.R-IL2



B. pRAd.ORF6-G.IL2

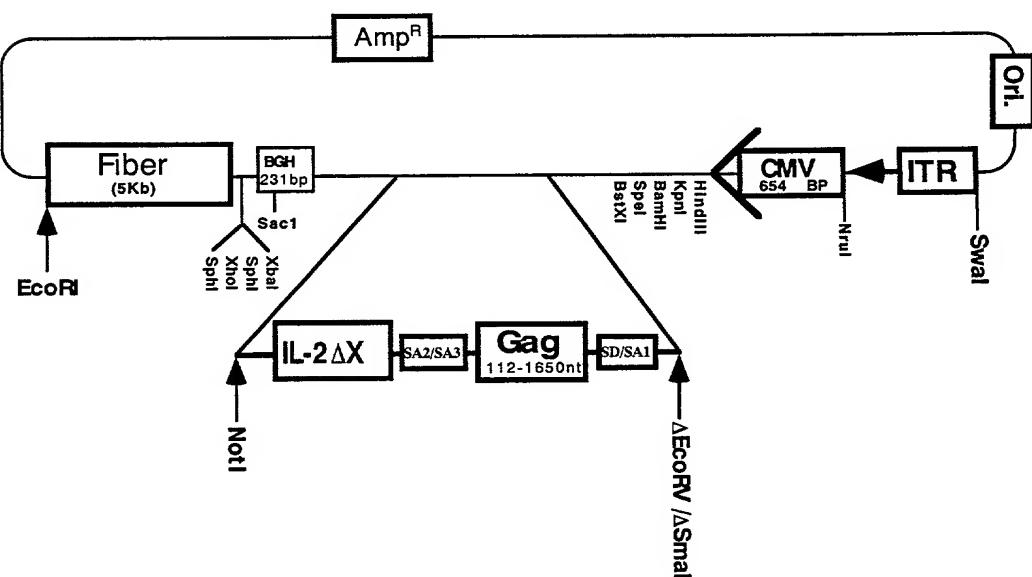


FIGURE 20

pLAd-ETRN

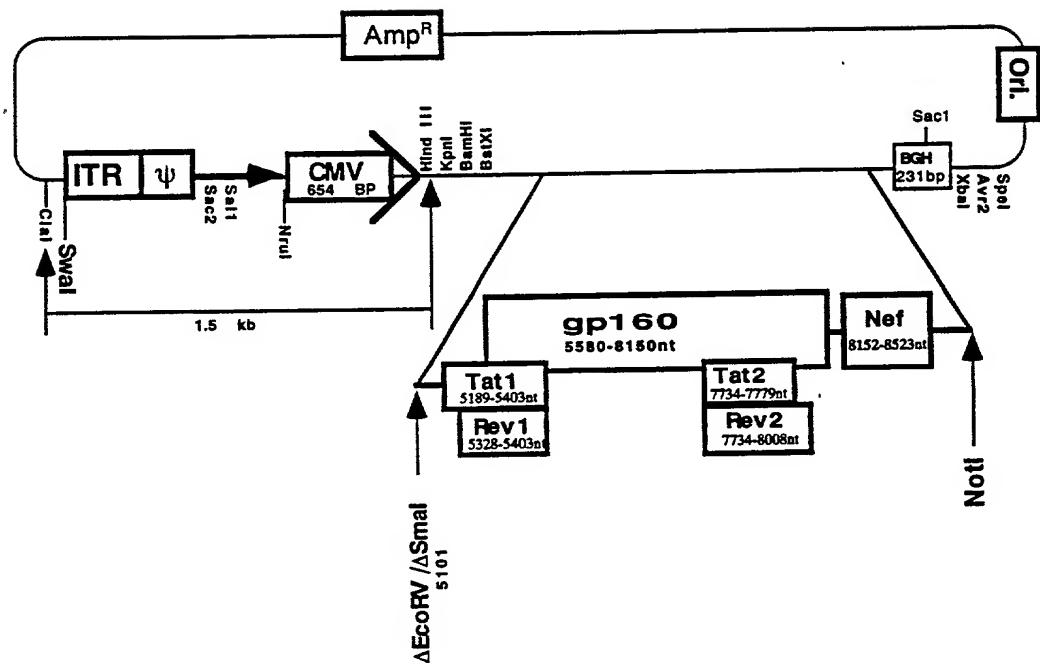


FIGURE 21

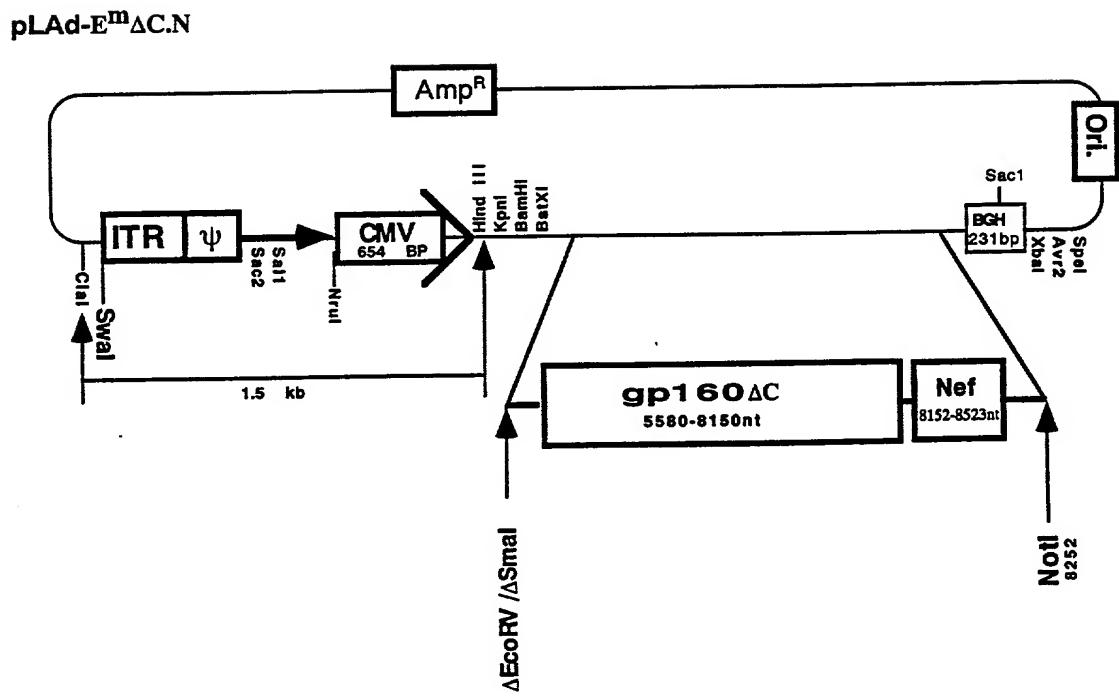


FIGURE 22

pLAd-E^mΔCAT³⁰⁰.T

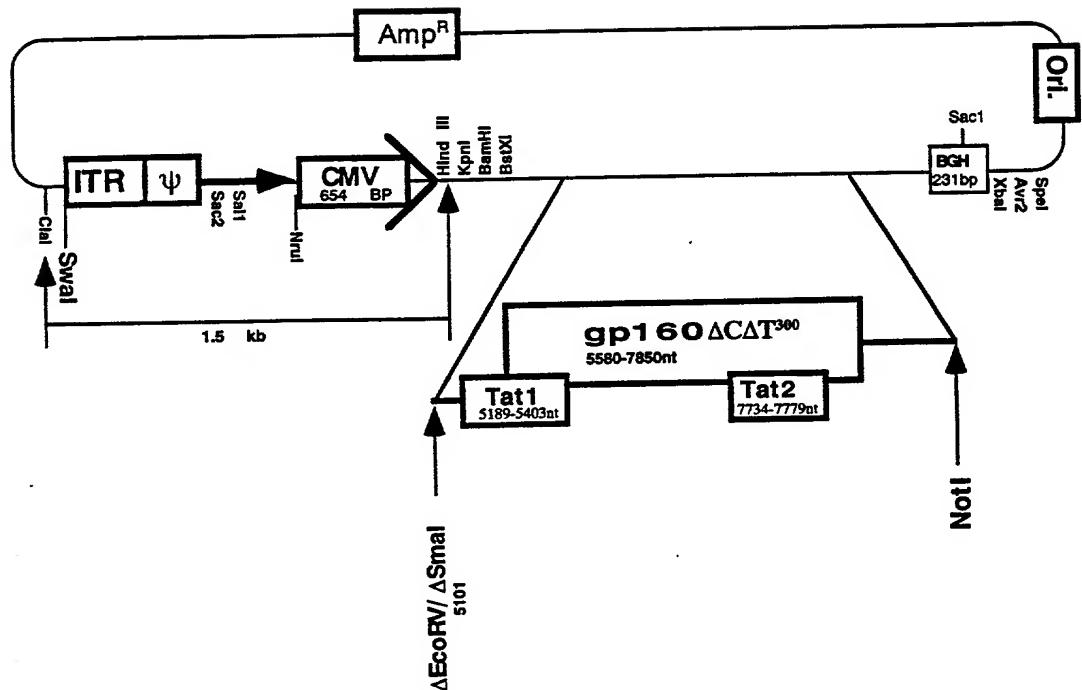
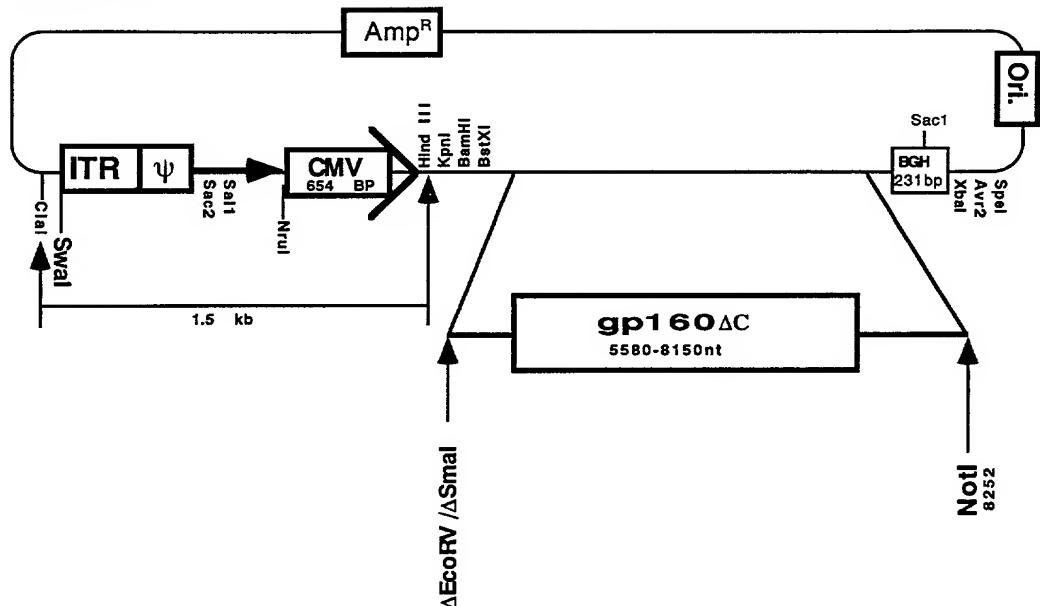


FIGURE 23

A. pLAd-E^mΔC



B. pRAd.ORF6-E^mΔC

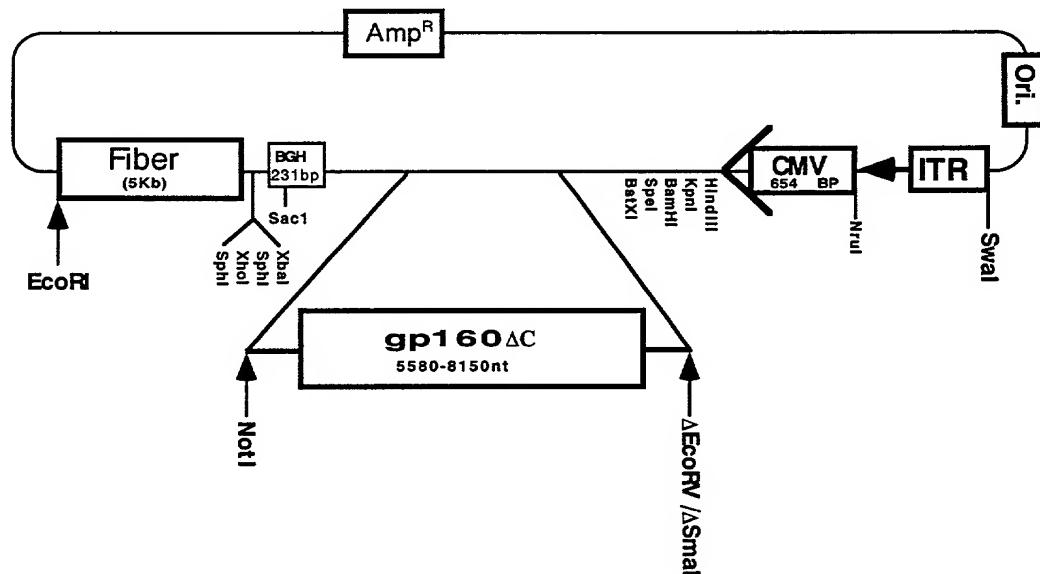
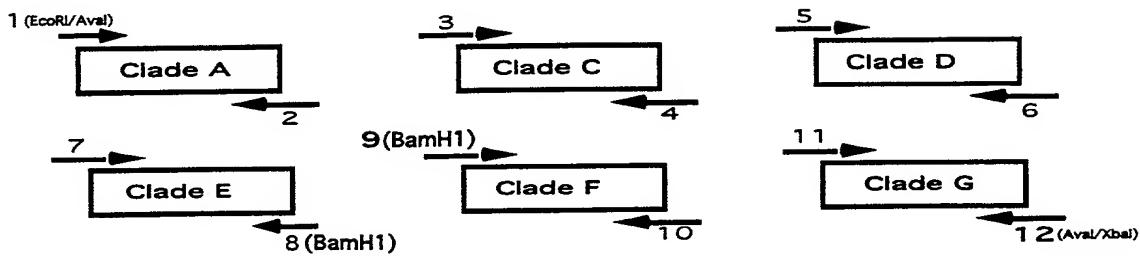
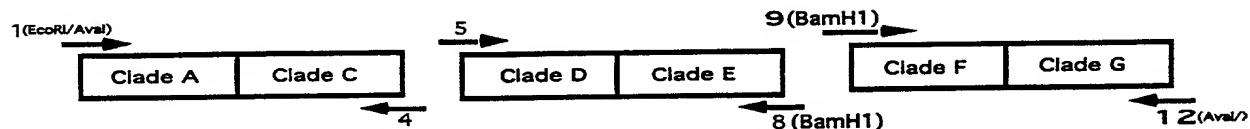


FIGURE 24

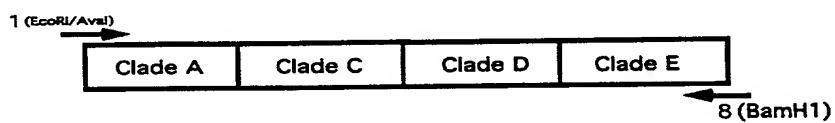
Step 1. Amplification of each individual clade A-G



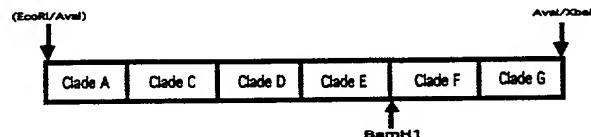
Step 2. Amplification of every two Clades AC, DE, FG



Step 3. Amplification of Clades ACDE



Step 4. Cloning the multi-clades into pSP73 vector



Step 5. Generating of a duplicated multi-clades

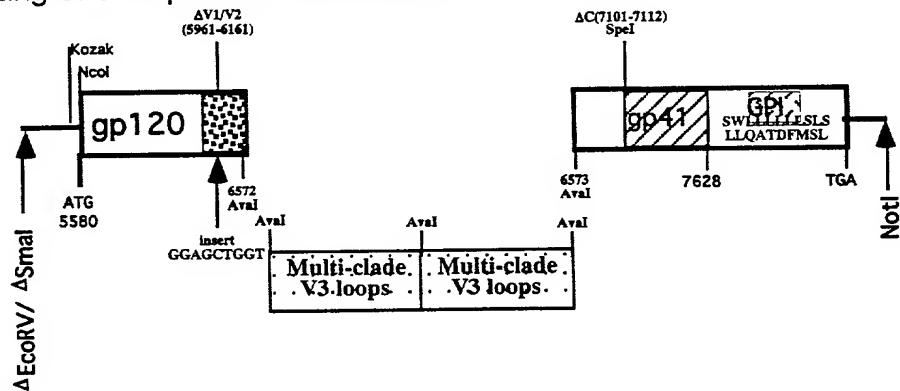


FIGURE 25

pLAd-E^m.V3

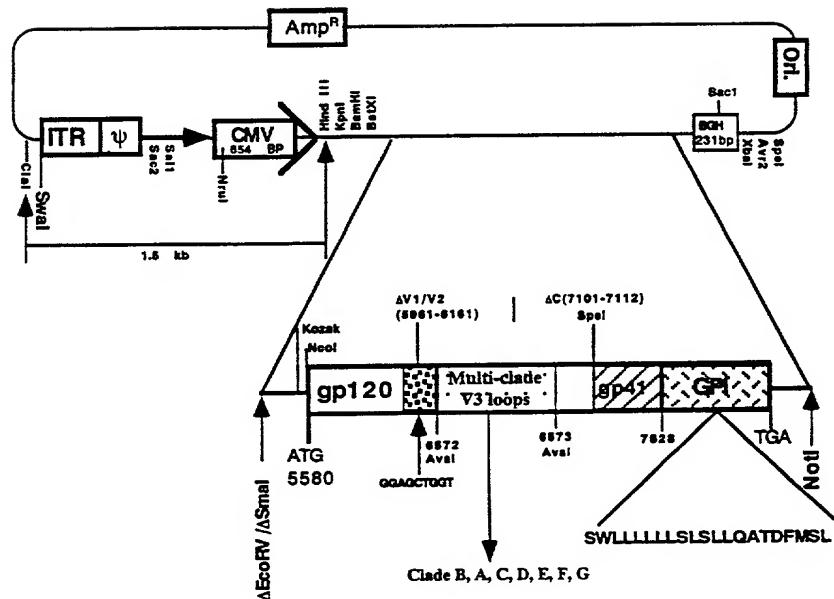


FIGURE 26

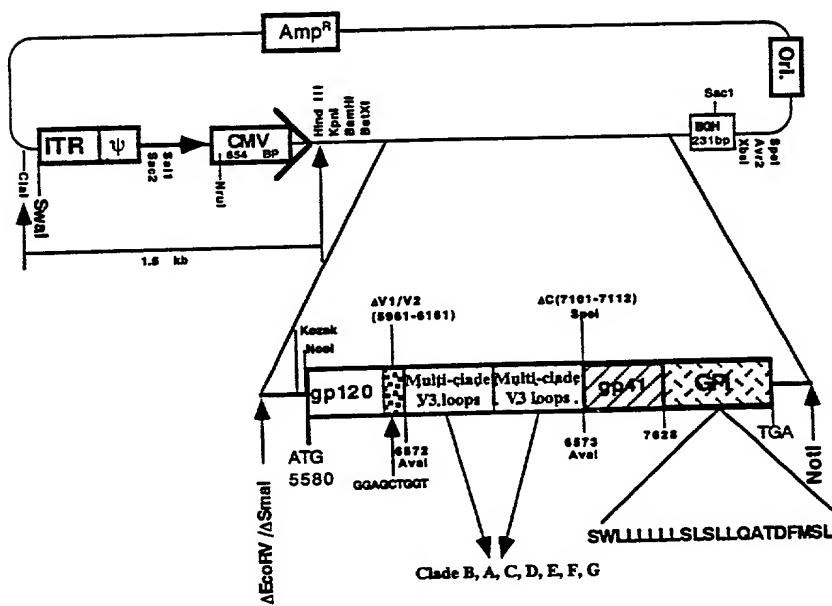


FIGURE 27

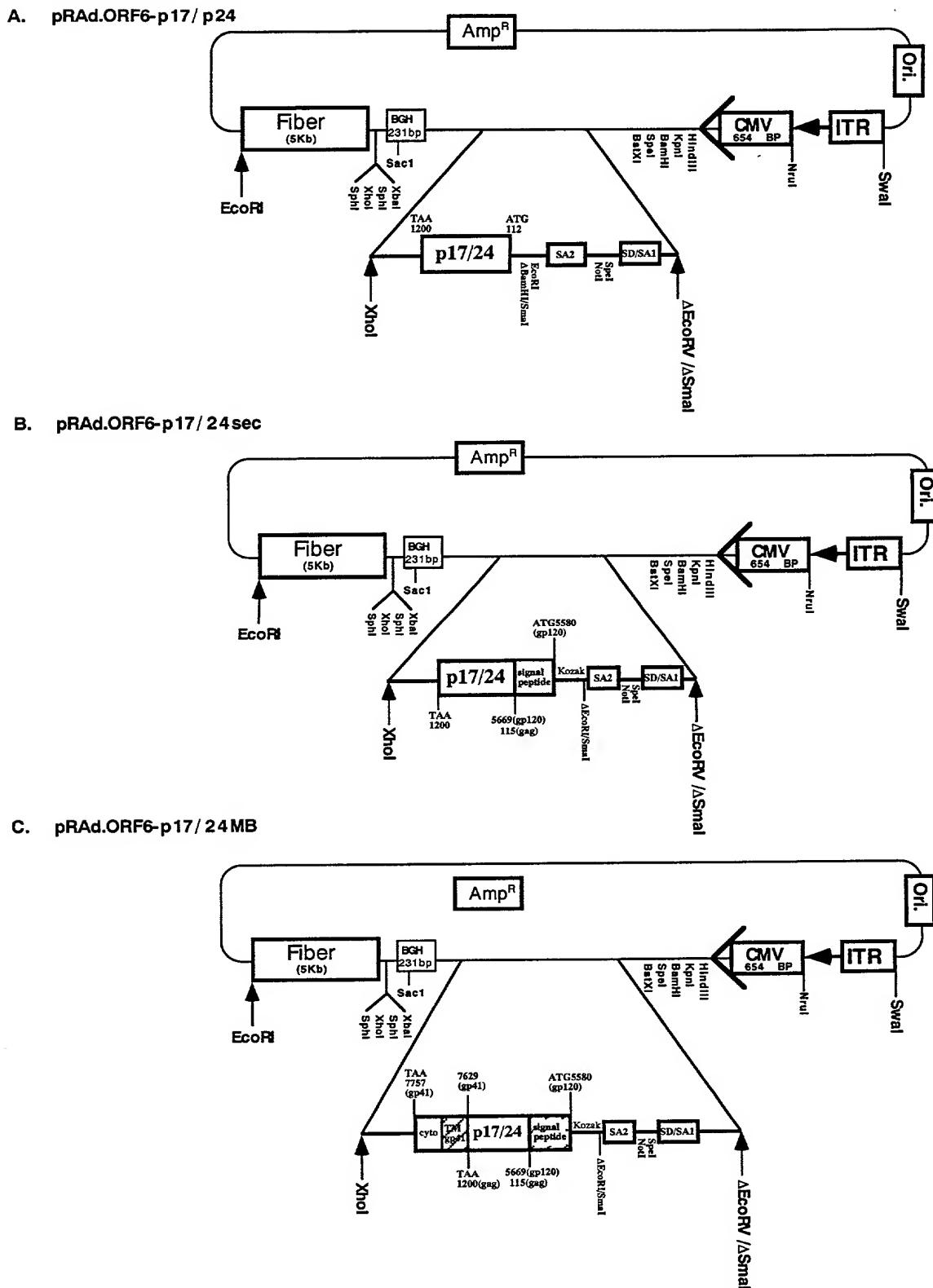
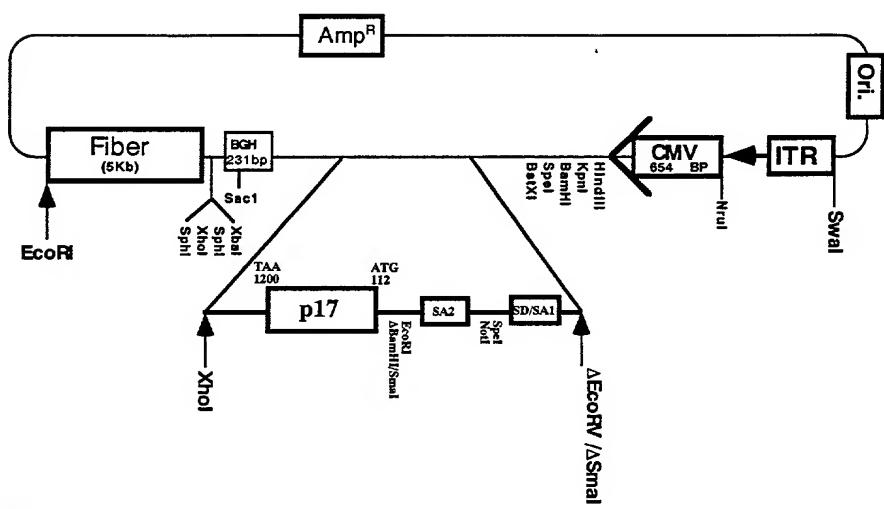
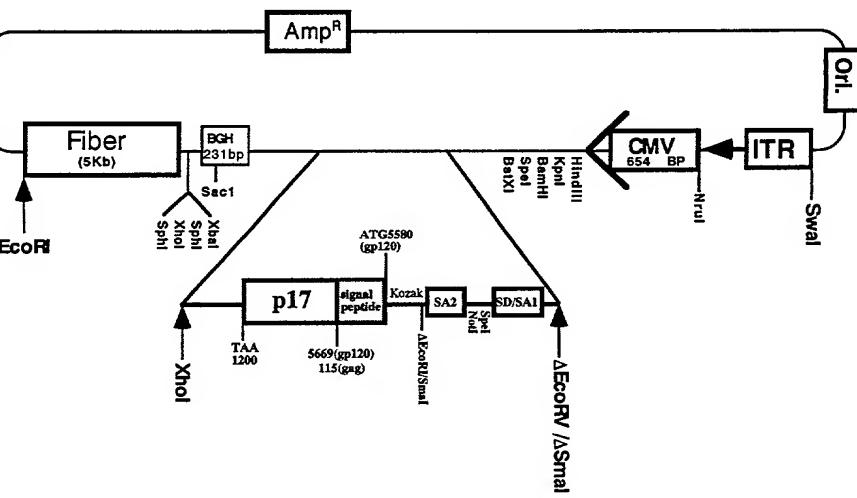


FIGURE 28

A. pRAd.ORF6-p17



B. pRAd.ORF6-p17sec



C. pRAd.ORF6-p17MB

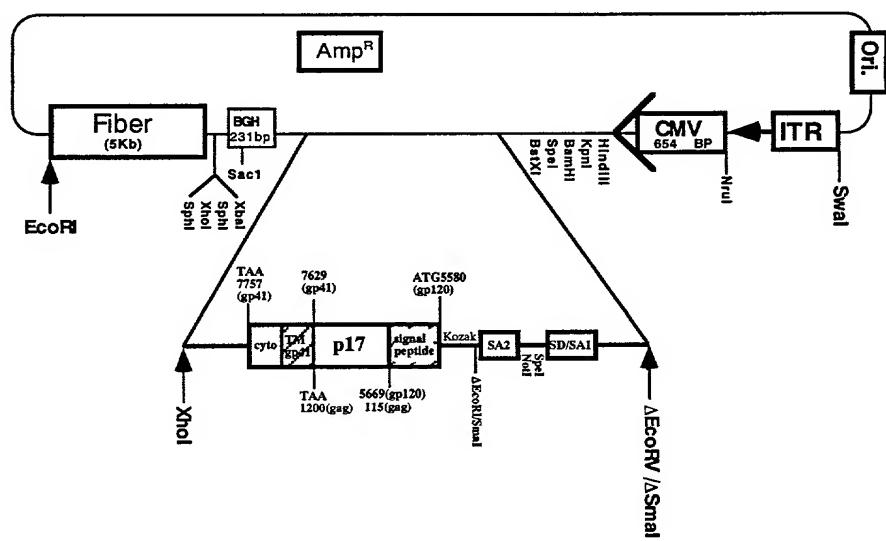


FIGURE 29

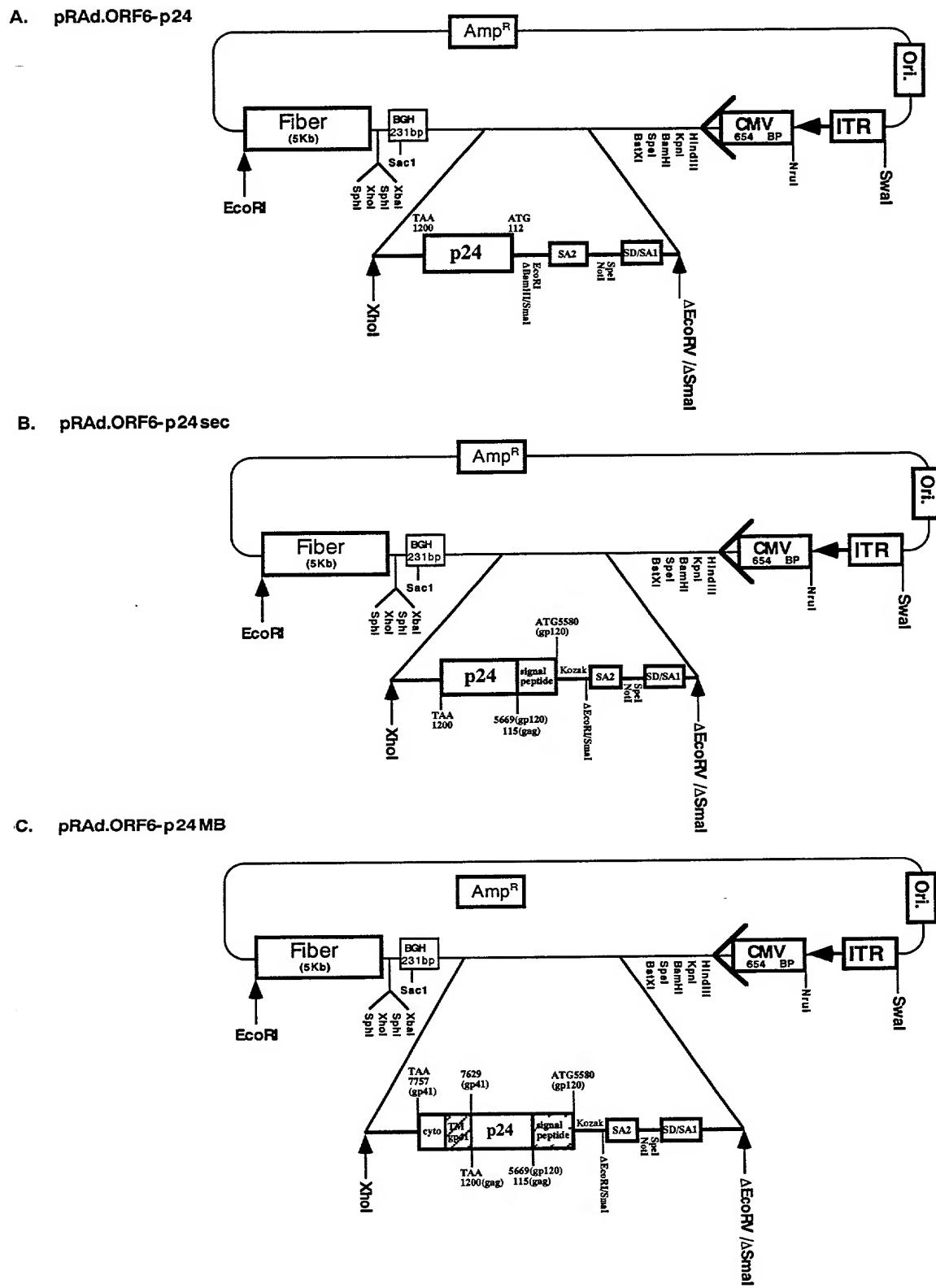


FIGURE 30 Adenoviral construct of Ad-Em.V3m/p17/24MB

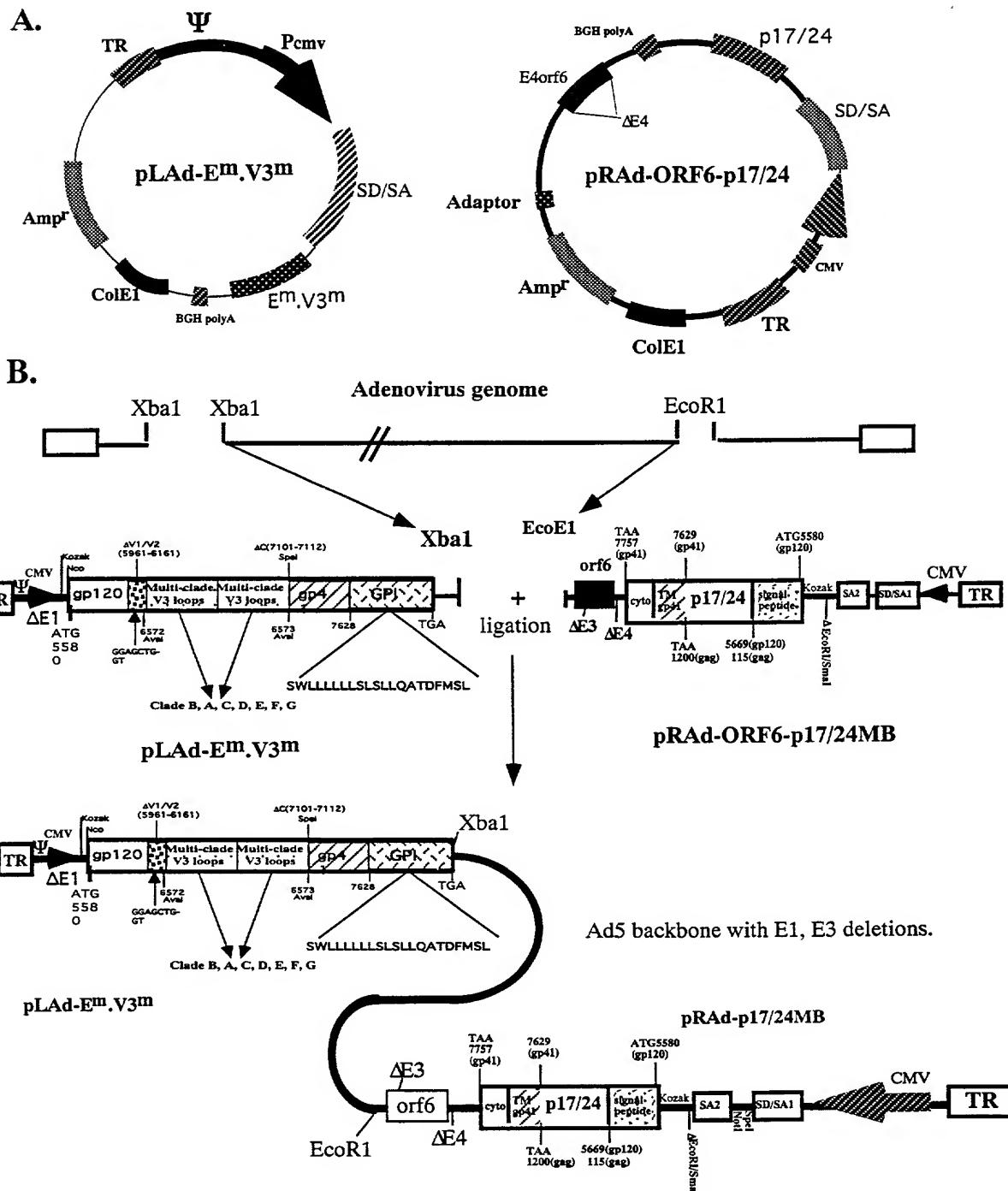


FIGURE 31 Adenoviral construct of Ad-Em.V3m/p17MB

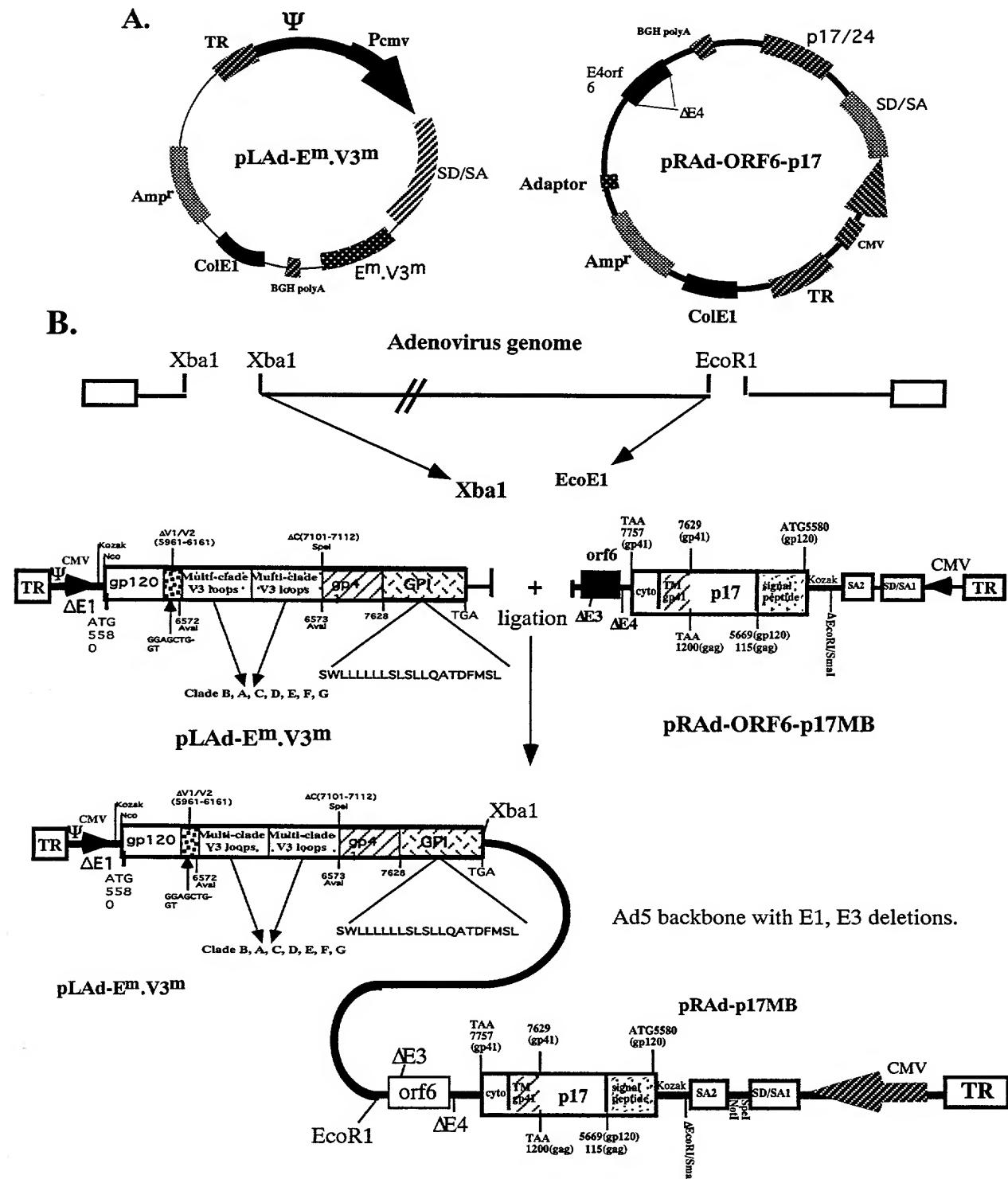


FIGURE 32 Adenoviral construct of Ad-Em.V3m/p24MB

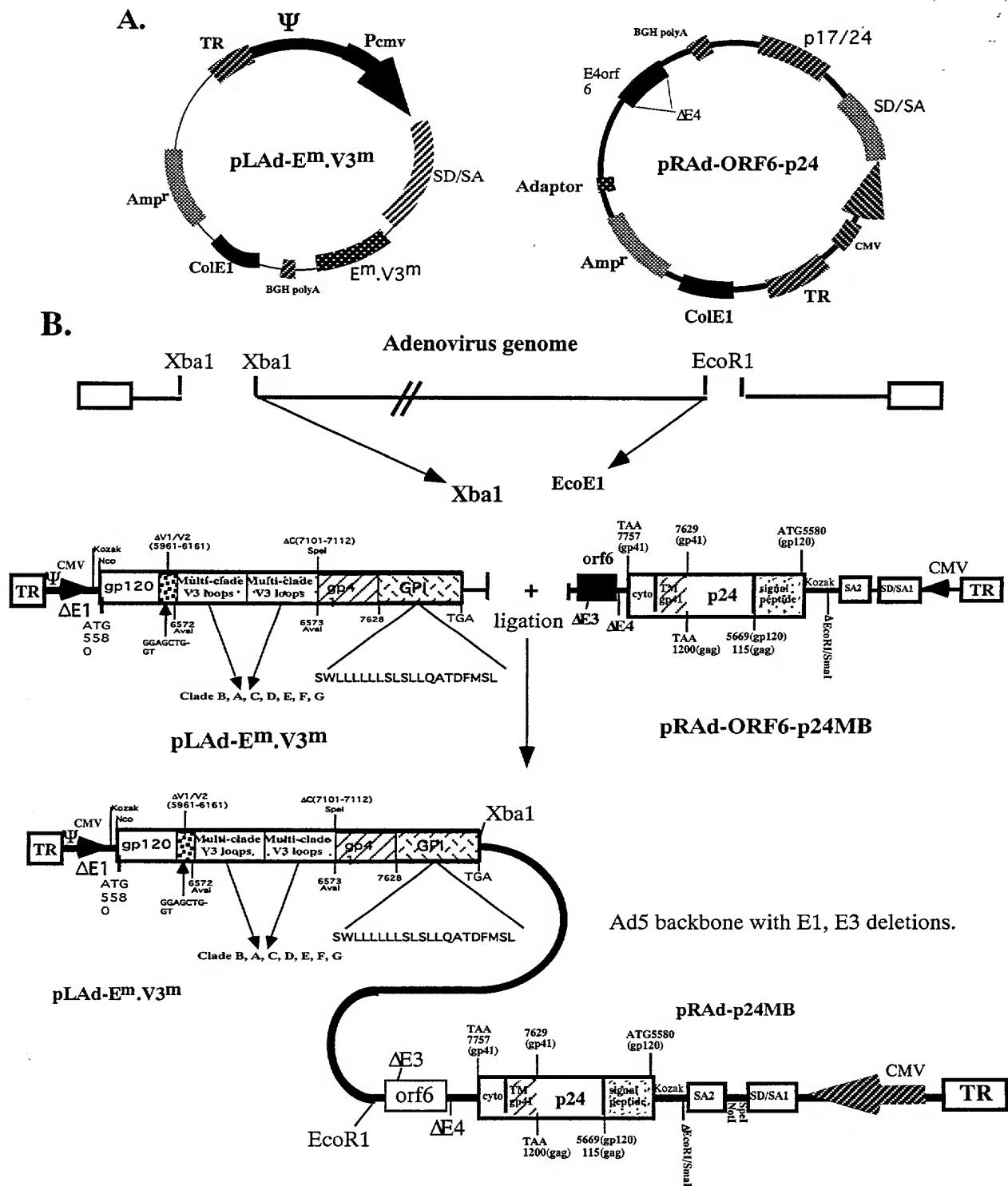


FIGURE 33

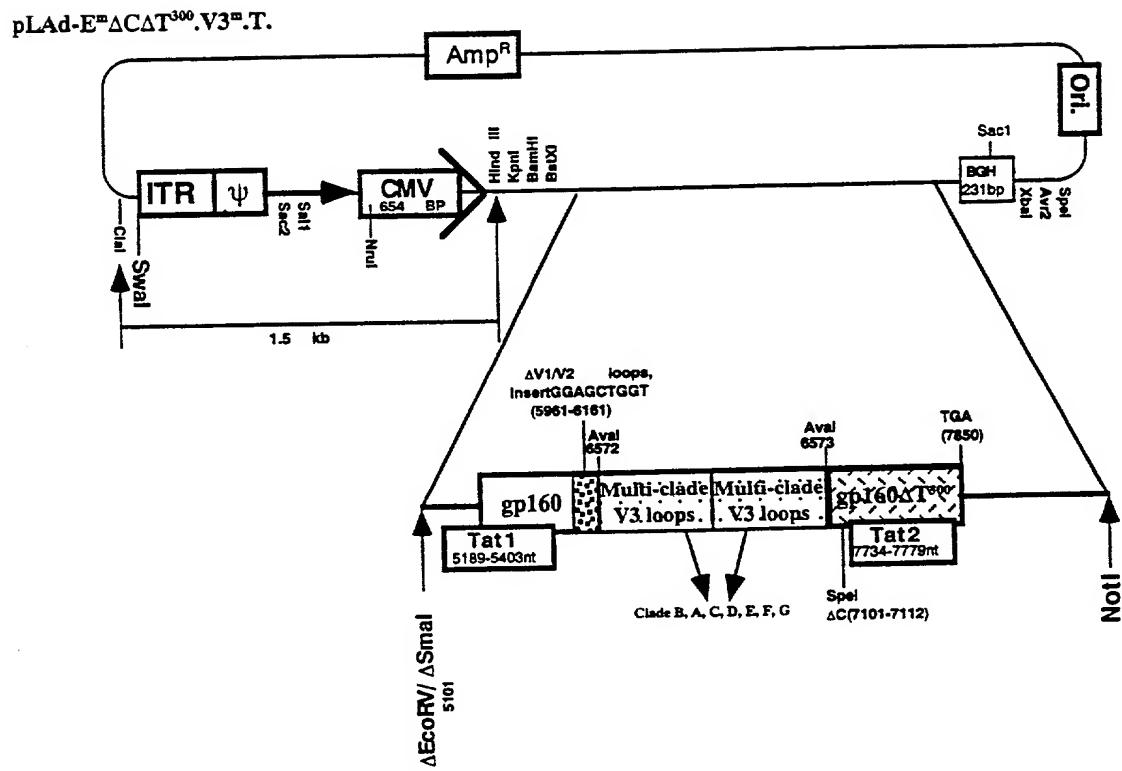
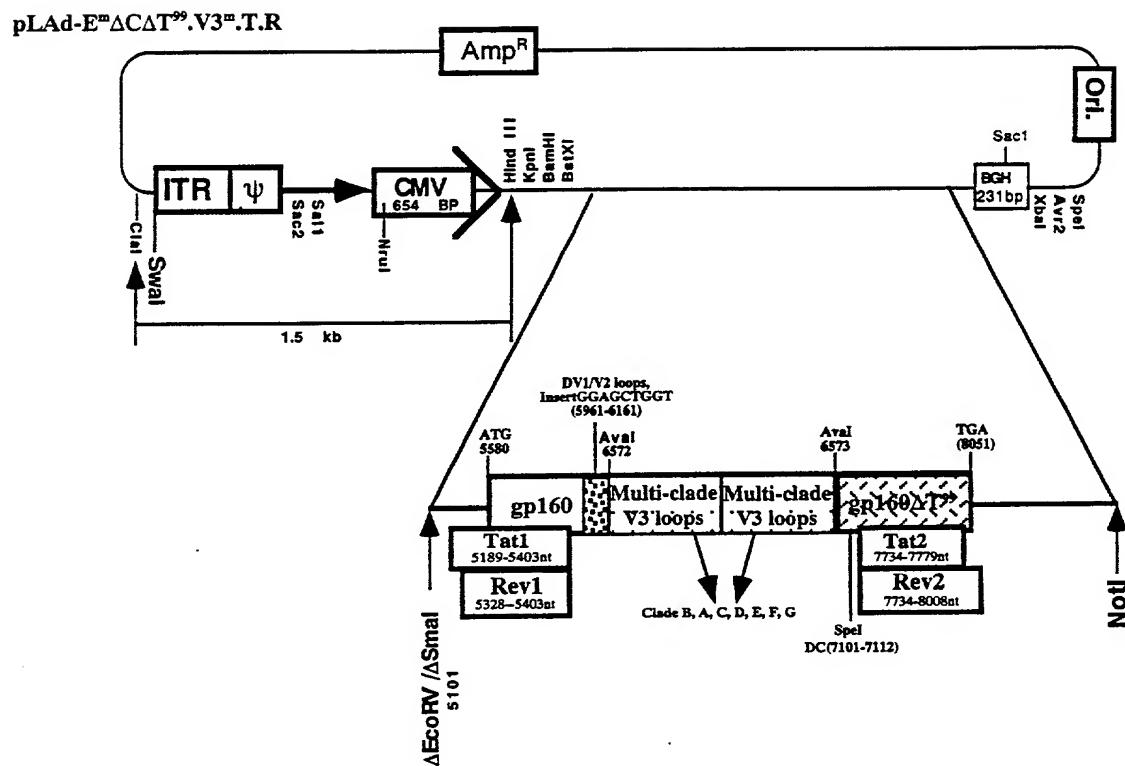


FIGURE 34



pRAd.ORF6-G.PI

FIGURE 35

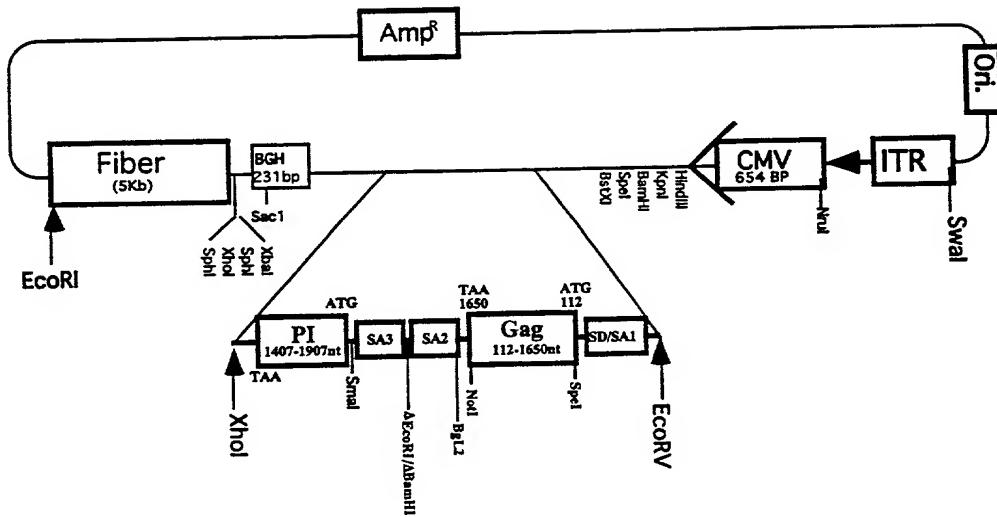


FIGURE 36

pRAd.ORF6-G-PI

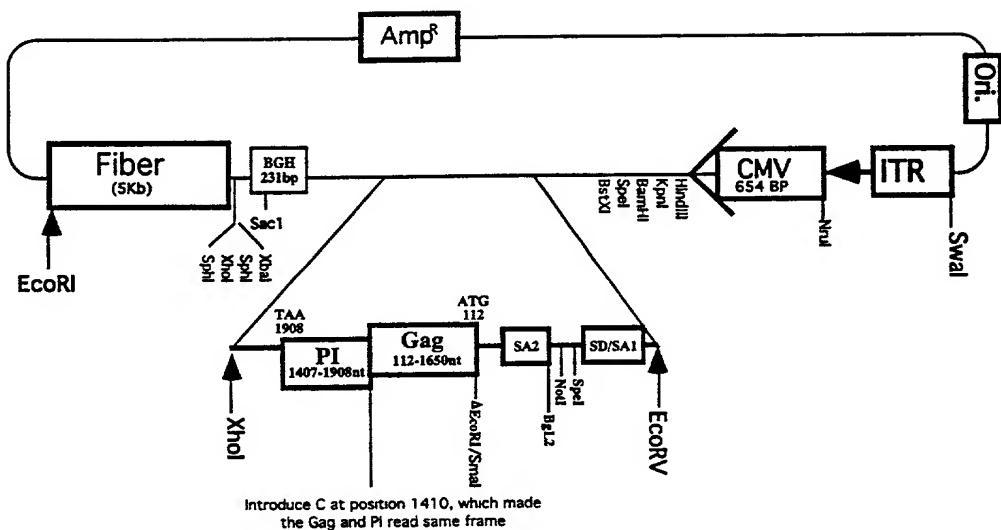


FIGURE 37

SD/SA1.2.3 vector

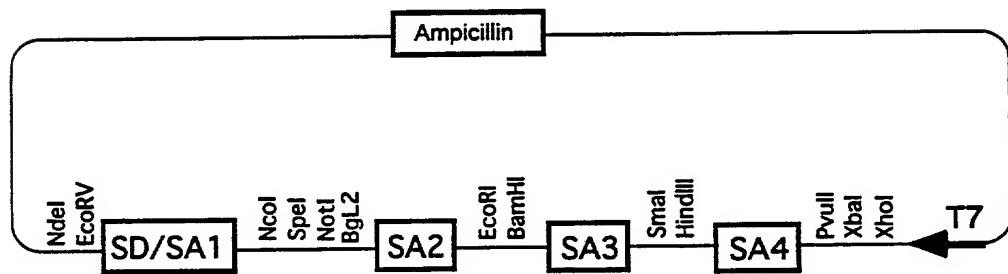


FIGURE 38

DNA Sequence of Env/Tat/Rev from BH10 clone [SEQ ID NO: 14]:

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EcoRI
agcagaataggcgtaactcgacagaggagagcaagaaatggagccagttagatccatagactagagccctgaa
agcatccaggaagtcagcctaaaactgcttaccatgttattgtaaaaagtgatgttgcattgcattgcattgcatt
gttgcattcataacaaaaggcttaggcattccatggcaggagaagcggagacagcgcagaagaccccttgcattgcatt
tcaaggcagtcaagactcatcaagttctatcaaagcagtaagttagtacatgtatgcacatataaaaaat
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aggaaaatattaagacaaaagaaaaatagacaggtaattgtatagactaatagaagagcagaagacagtt
caatgagagtgaaggagaatatcagcacttgcattgttgcattgcattgcattgcattgcattgcattgcatt
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tcaggatatttgcatttgcatttgcatttgcatttgcatttgcatt
gggttatagatgtatgtatgtatgtatgtatgtatgtat
gaaaggatatttgcatttgcatttgcatttgcatttgcatttgcatt
aaagaatgtatgtatgtatgtatgtatgtatgtatgtat
XbaI

FIGURE 39

DNA Sequence of IL-2 Δ X [SEQ ID NO: 15]:

Tcactctttaatcactactcacagtaacacctcaactcctgccacaatgta
caggatgcaactcctgtcttgcattgcactaagtcttgcacttgcacaaaa
cagtgcacctacttcaagtttacaaagaaaaacacagctacaactggagca
tttactgctggatttacagatgatttgaatggaattaataattacaagaa
tcccaaactcaccaggatgctcacatttaagtttacatgcccaagaaggc
cacagaactgaaaacatcttcagtgtcttgaagaactcaaacctctgga
ΔXbaI (cta → ctt)
ggaagtgctaaatttagctcaaagcaaaaactttcacttaagacccaggga
cttaatcagcaatatacgtaatagttctggactaaaggatctgaaac
aacattcatgtgtgaatatgctgatgagacagcaaccattgtagaatttct
gaacagatggattacctttgtcaaagcatcatctcaacactaacttga

FIGURE 40

DNA Sequence of Env^mΔCΔT³⁰⁰ (HIV strain BH10) [SEQ ID NO: 16]:

Gaattcgcccaccatggagtgaaggagaaaatcagcacttgcggatgt
EcoRI Kozak NcoI
gggggtggagatggggcaccatgctcctggatgttgcgtatctgtgtgcacagaaaaaa
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taaaacaaattataaacatgtggcaggaaagttaggaaaagcaatgtatgcaccctccatcag
tggacaaaatttagatgttcatcaaattacagggctgttataacaagagatgtggtaat
agcaacaatgagtcgcagatctcagacactgtggaggagatgtgggacaattggagaa
gtgaatttatataaataaagtagtaaaaatgtaaaccattaggagtagcaccaccaaggc
aaagagaagagtggtgcagACTAGTgcagtggaaataggagctt

ΔCleavage site (agagaaaaaaga) → SpeI

tgttccttgggttcttgggagcagcaggaagactatgggcgcagcgtcaatgacgctgac
ggtacaggccagacaattattgtctggtatagtgcagcagcagaacaattgctgagggct
attgaggcgcaacagcatctgttcaactcacagtctgggcatcaagcagctccaggcaa
gaatcctggctgtggaaagatacctaaggatcaacagctctgggattgggattgggattgctc
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gcttaatacactcctaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaatt
attggaaatttagataaatgggcaagttgtggattggtaacataacaaattggctgtgg
tatataaaatttattcataatgatagtagggaggcttggtaggttaagaatagttttgctg
tactttctgttagtgaatagtagttaggcagggatattcaccattatcgttcagaccacact
cccaatcccggggaccggacaggccgaaatagaagaagaagggtggagagagagac
agagacagatccattcgatttagtgaacggatccttagcacttatctggtaa

FIGURE 41A

DNA Sequence of Full length HIV-1 Gag [SEQ ID NO: 17]:

ggctagaaggagagggatgggtgcgagagcgtcagtattaagcccccc
aattagatcgatggaaaaattcggttaaggccagggaaagaaaaat
ataaattaaaacatatagtatggcaagcagggagctagaacgactacaac
catcccttcagacaggatcagaagaacttagatcattatataatacagtag
caaccctctattgtgtcatcaaaggatagagataaaagacaccaaggaag
cttagacaagatagaggaagagcaaaacaaaagtaagaaaaaagcacagc
aagcagcagctgacacaggacacagcagtcaggtcagccaaaattacccta
tagtgcagaacatccaggggcaaattgtacatcaggccatatacactagaa
ctttaatgcatggtaaaagttagttagaagagaaggcttcagccagaag
taataccatgtttcagcattatcagaaggagccacccacaagattaa
acaccatgctaaacacagtgggggacatcaagcagccatgcaaattgttaa
aagagaccatcaatgaggaagctgcagaatggatagagtagatccagtgc
atgcagggcctattgcaccaggccagatgagagaaccaagggaaagtgaca
tagcaggaactacttagtacccttcaggaacaaataggatggatgacaaata
atccacctatcccagtaggagaaattataaaagatggataatcctggat
taaataaaatagtaagaatgtataccctaccagcattctggacataagac
aaggacaaaagaaccttttagagactatgttagaccggctataaaaactc
taagagccgagcaagcttcacaggagtaaaaaattggatgacagaaacct
tggttgtccaaaatgcgaacccagattgtaaagactatttaaaagcattgg
gaccagcggctacactagaagaaatgtacagcatgtcagggagtaggag
gaccggccataaggcaagagtttggctgaagcaatgagccaagtaacaa
atacagctaccataatgtacagagaggcaattttaggaaccaaaagaaaga
tggttaagtgttcaattgtggcaaagaagggcacacagccagaaattgca
ggcccttagaaaaaggctgtggaaatgtggaaaggaaggacaccaaa
tgaaagattgtactgagagacaggctaatttttaggaagatctggcctt
cctacaagggaaggccagggatttcttcagagcagaccagagccaaacag
ccccaccatttcttcagagcagaccagagccaaacagccccaccagaagaga
gcttcaggtctgggttagagacaacaactccccctcagaagcaggagccga
tagacaaggaactgtatccttaacttccctcagatcactcttggcaacg
accctcgtaataa

FIGURE 41B

Amino Acid Sequence of HIV-1 (Strain BH10) Gag [SEQ ID NO: 18]:

M I A L E S S I S D L H A P I E A N E L G G G P P E N
G R S R I K Q S P L K A G I V P S P M A N H K K E E P D
A L R S K K N P E N E G T P R F Q D M E F T E I P E I P
R R E L D K Y R V T T P T V M R E C T A R A G W T S D S
A P L Y T A P T I M I I S G Y D V K A M N R H P A F K S
S G E N K Q I L P L N A T E S Y K T C S Q N Q S P R E Q
V G R T E Q V N M N E P L I P V N I Q Q R C M Y P S L *
L K L V A A Q A F T E G Q Y T D W L G V K R K K F G Y
G K P T D A I V A G A M Q R I F T A G N V P C R Q E L
S K Q A L A N W S V A Q E K S R M K V T M A D G L V P
G Y S L K D Q K L G E R I W L Y E L G T K R T P S T T
E K L Y I T G V S H W E G I D K T G P A C K E G R T S
L L Q C E G Q V E Q D P W I I T L P G T F K R N P T L
D K T V E H M E G A R R M L R L L A H I N G Q F E P R
W I S Q Q S H K T M H S N L G A Q T A M G W N Q T Q L
R H G H E S V E A A V G T G Q R V A K M C C A L P P S
K W E I K V A F Q M V I P K K Q A E V R E C L R P Q G
E V E R N Q Q A P Q P D N N P E N L R Q K K F S A K F

FIGURE 42

DNA Sequence of $E^m\Delta C\Delta T^{99}.T.R$ (HIV strain pNL4-3) [SEQ ID NO: 19]:

FIGURE 43

DNA Sequence of E^mΔV₁₂ΔCΔT⁹⁹.T.R (Strain pNL4-3) [SEQ ID NO: 20]:

FIGURE 44

DNA Sequence of Env^mΔ.C.T.R.N (Strain BH10) [SEQ ID NO: 21]:

GAATTCTGCAACAACCTGCTGTTATCCATTTCAGAAATTGGGTGTCGACAT
EcoRI
AGCAGAAATAGCGTTACTCGACAGAGGAGAGCAAGAAATGGAGGCCAGTAGATCCTAGACTAGAGCCCTGGA
AGCATCCAGGAAGTCAGCCTAAAACTGCTGTACCAATTGCTATTGTTAAAAGTGTGCTTCATTGCCAA
GTTTGTTCATAACAAAAGCCTTAGGCATCTCCTATGGCAGGAAGAAGCGGGAGACAGCGACGAAGACCTCC
TCAAGGCAGTCAGACTCATCAAGTTCTCATCAAAGCAGTAAGTAGTACATGTAATGCAACCTATAACAA
TAGCAATAGTAGCATTAGTAGCAATAATAAGCAATAGTTGTGTTGGCCATAGTAATCATAGAAATAT
AGGAAAATATTAAAGACAAAGAAAATAGACAGGTTAATTGATAGACTAATAAGAAAGAGCAGAAGACAGTGG
CAATGAGAGTGAAGGAGAAATATCAGCACTTGTGGAGATGGGGTGGAGATGGGGCACCAGTCTCCTTGGG
ATGTTGATGATCTGTAGTGTACAGAAAATTGTGGGTACAGTCATTATGGGTACCTGTGTGGAAGGA
AGCAACCACCACTCTATTTGTGATCAGATGCTAAAGCATATGATAACAGAGGTACATAATGTTGGCCA
CACATGCCGTGTACCCACAGACCCCAACCCACAAGAAGTAGTATTGGTAAATGTCAGAGAAAATTAAAC
ATGTTGAAAATGACATGGTAGAACAGATGCTGAGGATATAATCAGTTATGGGATCAAAGCCTAAAGCC
ATGTTGAAATTAAACCCACTCTGTGTTAGTTAAAGTGCACTGTTGAAGAATGATAACTAACTACAA
GTAGTAGCGGGAGAAATGATAATGGAGAAAGGGAGAGATAAAACTGCTCTTCAATATCAGCACAAGCATA
AGAGGTAAGGTGCAAGAAAGAATGCTTAAACTCAGTCATTACACAGGCGTGTCCAAGGTATCCTTGAGC
CAGCTACAGCTGACAAGATTGTAACACCTCAGTCATTACACAGGCGTGTCCAAGGTATCCTTGAGC
TTCCCATATTGTGCCCGCTGGTTGCGATTCTAAAGTGAATAATAAGACGTTCAATGGAACA
GGACATGTACAATGTCAAGCAGTACAATGTACACATGGAATTAGGCCAGTAGTACACTCAACTGCT
GTAAATGGCAGTCTGGCAGAAGAAGAGGTAGTAATTAGATCTGCCAATTTCACAGACAATGCTAAAACCA
TAATAGTACAGCTGAACCAATCTGTAGAAATTGTTACAAGACCCAAACAACAAGAAAAGTATC
CGTATCCAGAGAGGACCGAGGAGAGCATTGTTACAATAGGAAAATAGGAAATATGAGACAAGCACATTG
TAACATTAGTAGAGCAGAAATGAAATAACACTTTAAACAGATAGATAAGGAAACAATTGAA
ATAATAAAACAATAATCTTAAGCAGTCCTCAGGGGACCCAGAAATTGTAACGCACAGTTTAATTGT
GGAGGGAAATTTCTACTGTAATTCAACACAAACTGTTAATAGTACTTGTGTTAATAGTACTTGGAGTAC
TAAAGGGTCAAATAACACTGAAGGAAGTGCACACAATCACCCCTCCCATCGTGGACAAATTAGATGTT
TGTGGCAGGAAGTAGGAAAAGCAATGATGTCAGGAGGAGCAGCTGGTACATGAAATTAGGAG
ACAGGGCTGCTTAAACAAGAGATGGTGTAAATGAGCAGTCAGGAGCTTCAGACCTGGAGGAG
AGATAGGAGGACAAATTGGAGAAGTGAATTATAAAAGTAGTAAATTGAACCATTAGGAGTAG
CACCCACCAAGGCAAAGAGAGTGGTCAGACTAGTGCAGTGGGAATAGGAGCTTGTGTTGGGTT
T

Δ Cleavage site (agagaaaaaaga) → SpeI

TGGGAGCAGCAGGAAGCACTATGGCGCAGCGTCATGACGCTGACGGTACAGGCCAGACAATTATTGCT
GGTATAAGTCAGCAGCAGAACATTGCTGAGGGCTATTGAGGCGCAACAGCATCTGTTGCAACTCACAGT
CTGGGGCATCAAGCAGCTCCAGGCAAGAACTCTGGCTGTGGAAGATAACCTAAAGGATCAACAGCTCCTGG
GGATTTGGGTTGCTCTGGAAAACCTATTGTCACCAGCTGCTGTGCGCTGGAAATGCTAGTTGGAGTAATAAA
TCTCTGGAACAGATTGGAATAACATGACCTGGATGGAGTGGACAGAGAAATTAAACAATTACACAAGCTT
AAATAACACTCCTTAATTGAAAGAATCGCAAACCAACAGCAAGAAAAGAATGAAACAAGAATTATTGAAATTAGATA
AAATGGGCAAGTTGTTGGAATTGGTTAACATAACAAATTGGCTGTGTTAATATAAAATTATTCTATAATGATA
GTAGGAGGCTGTGTTAGGTTAAGAATAGTTTCTGTACTTCTGTAGTGAATAAGAGTTAGGCGAGGGATA
TTCAACATTATGTTCAAGACCCACCTCCCAATCCCAGGGGACCCGACAGGCCAGGAAGGAATAGAAG
AAGGTGGAGAGAGAGAGAGACAGATCCATTGCTGAGTGTGAAACGGATCCTTAGCATTCTGGAGCAG
CTGCGGAGCCTGTCCTCTGAGCTACCCAGCTGAGGAGACTTACTCTGTTGTAACCGAGGATTGTGGA
ACTTCTGGGACGCGAGGGGTGGAAGGCCCTCAAATATTGGTGGAACTCCTACAGTATTGGAGTCAGGAGC
TAAAGAAATAGTCGTGTTAGCTGCTCAATGCCACAGCTATAGCAGTAGCTGAGGGGACAGATAAGGGTT
GAAGTAGTACAAGGAGCTTATAGAGCTTCAGGCCACATACCTAGAAGAATAAGACAGGGCTGGAAAGGAT
TTTGCTATAAGATGGGTGGCAAGTGGTCAAAAAGTAGTGTGGTTGGATGGCCTGCTGTAAGGGAAAGAATG
AGACGAGCTGAGCAGCAGCAGATGGGGTGGAGCAGCATCTCGAGACCTAGAAAAACATGGAGCAATCAC
AAGTAGCAACACAGCAGCTAACATGCTGATTGTCCTGGCTAGAAGCACAAGAGGAGGGAGGTGGGTT
TTCCAGTCACACCTCAGGTACCTTAAGACCAATGACTTACAAGGCAGCTGAGTAGTCTAGCCACTTTA
AAAGAAAAGGGGGACTGGAGGGCTAACATTCACTCCAAACGAAGACAAGATACTCTGATCTGTGGATCTA
CCACACACAAGGCTACTCCCTGATTAG

FIGURE 45

DNA Sequence of E^mΔC.N (Strain BH10) [SEQ ID NO: 22]:

Gaattcgccaccatgggagtgaaggagaaaatcagcacttgtggagatgg
 EcoRI Kozak NcoI
 gggggagatggggcaccatgctcctggatgtttagtctgttagtgcataaaaaattgtgggtcac
 agtctattatgggtacctgtgtggaaaggacaaccaccactctatttgcatacgatgctaaagcat
 atgatacagaggtacataatgttggccacacatgcctgttgcataccacagaccccaacccacaagaagta
 gtattggtaatgtgacagaaaatttacatgtggaaaatgacatgttgcatacgatgcatgaggatata
 aatcgtttatggatcaaaggccatgtgtaaaattaaacccactctgttttagttaaagtgc
 ctgatttgaagaatgataactaataccatagtagcgggagaatgataatgggagaaggagagataaaaa
 aactgctttcaatcatacgccacaaggcataagaggttgcagaaaaagatgtcatttttataaact
 tggatataataccatagataatgataactaccaggctatacgttgcatacgatgttgcataccctcagtcattac
 aggccgttccaaaggatccttgagccaaattccatataattttgttgcgggttgcgttgcattctt
 aatgtataataaaggacgttcaatggacaggccatgtacaaatgtcagcacagtacaatgtacacatgg
 aattaggccagtagtatcaactcaactgttgcagttgcagttgcagaagagaggttagtattagat
 ctgccaatttcacagacaatgctaaaaccataatagtagcgttgcacccatctgttagaaattatgtaca
 agacccaaacaacaatatacaagaaaaagtagtccgttatccagagaggaccaggagagcattttgttacaatagg
 aaaaatagggaaatatggagacaaggccatgttgcatacatttagtagagcaaaatggaaataacactttaaaacaga
 tagatagcaattaaaggacacaatttggaaaataataaaaacaataatcttgcagttgcctcaggaggggac
 ccagaaaattgttgcacagtttgcataattgtggggaaatttttctactgttgcataatcacaactgtttaa
 tagtacttgtttaatagtacttgttgcataaaagggttgcataactgttgcagttgcaccaatcccc
 tcccatgcagaataaaaacaaattataacatgttgcagggactgttgcataatgttgcctcaggaggggac
 agtggacaaaatttagatgttgcataatattacagggctgttgcataatcacaagagatgttgcataacaaa
 tgagtccggatcttcagacctgtggggggatgttgcataatgttgcagttgcaccaaggccaccaaggcaagagaagatgttgcagACTAGTgc
 gtggggataggagcttgcattttgttgcgggttgcgggg
 A Cleavage site (gggggggggg) → SphI

ΔCleavage site(agagaaaaaaga)→Spel

agcaggaaagcaactatggcgccagcgtaatgacgctgacggtacaggccagacaattattgtctggatag
tgcagcagcagaacaatttgcgagggctattgagggcaacagcatctgttgcactcacagtctgggg
atcaagcagctccaggcaagaatcctggctgtggaaagatacctaaggatcaacagctctgggatttg
gggttgcgtcgaaaactcattgcaccactgtgtgccttggatgttagttggagtaataatctctgg
aacagatttggaaataaacatgaccctggatggagtggacagagaaaattaacaattacacaagcttaatacac
tccttaattgaagaatcgaaaaccaggcaagaaaagaatgaacaagaattattgaatttagataatggg
aagtttggattgtttaacataacaattggctgtgttatataaaattattcataatgtatagtaggag
gttggtaggtttaagaatagtttgcgtactttgttagtgaatagagtttaggcaggatattcaca
ttatcgttcagaccacccatcccattcccgaggggaccgcacaggccgaaggatagaagaaggtgg
agagagagacagagacatccattcgattgtgaacgatccttagcacttacatctggacgatctgcgg
gcctgtgcctcttcgactaccacgcgttggagacttactcttgcattgttgcacggattgtggatcttcg
ggacgcagggggtggaaaggccctaaatattttgtggatctcctacagatgttaggtcaggagctaaagaa
tagtgcgtttagcttgcataatgcacacagctatagcgttagctgagggcagatagggatataagtag
tacaaggagcttataagacttccacataccataagaagaataagacaggcttggaaaggatttgcata
taagatgggtggcaagtggtaaaaaagtagtgcgttggatggctgtgttaaggaaagaatgagacgag
ctgagccacgcacatgggggtggagcagcatctcgagaccttagaaaaacatggagcaatcacaagtagc
aacacacgcacatgcataaccatgcgttgcctggctagaagcacaagaggaggaggaggatgggtttccagt
cacacctcaggtagtaccccttaagaccaatgacttacactccaaacgaagacaagatccctgtatctgtggatctaccacaca
caaggctactccctgattag

FIGURE 46

DNA Sequence of E^mΔCAT³⁰⁰.T (BH10) [SEQ ID NO: 23]:

Figure 47

DNA Sequence of E^m/E^m (BH10) [SEQ ID NO: 24]:

Guattcgccaccatgggagtgaaggagaaatatcagcacttgtggagatgg
EcoRI Kozak NcoI
gggtggagatggggcaccatgccttggatgttgcatactgttagtgcatacagaaaaattgtgggtcac
agtctattatgggtacctgttgcagaaagcaaccaccactctatggatgcatacagatgcataagcat
atgatacagaggtacataatgttggccacacatgcctgttgcatacagaccccaaccacaagaagta
gtattggaaatgttgcacagaaaattttacatgtggaaaatgcacatgttagacacagatgcatac
aatcgtttatggatcaaagcataagccatgttgcataaattttacccactctgttttagttaaagtgca
ctgatttgcataatgttgcataataccatagtagtagcgggagaatgataatggagaaaggagagataaaa
aactgccttcaatatcagcacaagcataagaggtaaggtgcagaaaagaatatgcatttttataaact
tgatataatccaatagataatgcataactaccacgtatacgttgcacagttgttgcatac
aggcctgtccaaaggatccttgcacccatcatacattattgtggcccccgtgttttgcattcta
aatgtataataaagacgttcaatggacaggaccatgttgcacacgttacatgttgcata
aatttaggcactgttagtcaactcaactgttgcataatggcactgttgcacaaaatgttgcata
ctgcaatccacagacaatgttgcataatggcactgttgcacaaaatgttgcata
agacccaaacaacaatacaagaaaatgttgcataatggcactgttgcacaaaatgttgcata
aaaataggaaatataatgttgcacatgttgcataatggcactgttgcata
tagatggaaaatttgcataatggcactgttgcataatggcactgttgcata
ccagaaaattgttgcacatgttgcataatggcactgttgcata
tagtactgttgcataatggcactgttgcataatggcactgttgcata
tccatgttgcataatggcactgttgcataatggcactgttgcata
agtggacaaaattgttgcataatggcactgttgcataatggcactgttgcata
tagtccgagatcttgcacatgttgcataatggcactgttgcata
aagttagaaaaattgttgcacatgttgcataatggcactgttgcata
agagcactgttgcataatggcactgttgcataatggcactgttgcata
aatgttgcataatggcactgttgcataatggcactgttgcata
ctattggcgcaacagcatgttgcataactcacatgttgcata
gctgtggaaagatacctaaaggatcaacagatcttgcataatggcactgttgcata
cactgttgccttgcataatggcactgttgcataatggcactgttgcata
tggagtggacagagaaaatttgcataatggcactgttgcata
caagaaaagaatgttgcataatggcactgttgcata
aaatttgcataatggcactgttgcataatggcactgttgcata
ctgtacttgcataatggcactgttgcataatggcactgttgcata
ccggggggccgcacaggccgcacaggatcaatggcactgttgcata
atagtgttgcataatggcactgttgcataatggcactgttgcata
ttagagacttgcataatggcactgttgcataatggcactgttgcata
tattggcactgttgcataatggcactgttgcataatggcactgttgcata
agctatagcactgttgcataatggcactgttgcataatggcactgttgcata
acataccttgcataatggcactgttgcataatggcactgttgcata

FIGURE 48

Sequences of V3 loop Multi-clade HIV-1 Clones:

Clade	ACC#	HIV-1 Strain	From(nt)	To(nt)
B	M15654	BH10	885	992
A	U09127	192UG037WHO.01083hED	888	992
C	U09126	192BR025WHO.01093hED	876	980
D	U43386	192UG024.2	888	989
E	U08458	193TH976.17	894	998
F	U27401	193BR020.17	888	992
G	U30312	192RU131.9	885	989

Tgtacaagacccaacaacaatacaagaaaaaagtatccgtatccagagagga
ccagggagagcattgttacaataggaaaaataggaaatatgagacaagca
cattgt **Clade B [SEQ ID NO: 25]**

Tgtaccagacctaacaacaatacaagaaaaaagtgtacgtataggaccagga
caaacattctatgcaacaggttatataataggggatataagacaagcacat
tgt **Clade A [SEQ ID NO: 26]**

Tgtacgagacccaacaataatacaagaaaaaagtataaggataggaccagga
caagcattctatgcaacagggagaaataataggagatataagacaagcacat
tgt **Clade C [SEQ ID NO: 27]**

Tgcacaaggccctacaacaatataagacaaaggaccccataggactaggg
caagcactctataacaacaagaagaatagaagatataagaagagcacattgt
Clade D [SEQ ID NO: 28]

Tgtaccagaccctccaccaatacaagaacaagtatacgtataggaccagga
caagtattctatagaacacaggagacataacaggagatataagaaaagcatat
tgt **Clade E [SEQ ID NO: 29]**

Tgtacaagacccaacaacaatacaagaaaaaagaatatcttttaggaccagga
cgagtattttatacagcaggagaaataataggagacatcagaaaggcacat
tgt **Clade F [SEQ ID NO: 30]**

Tgtaccagacctaataacaatacaagaaaaaagtataactttgcaccagga
caagcgctctatgcaacaggtgaaataataggagatataagacaagcacat
tgt **Clade G [SEQ ID NO: 31]**

FIGURE 49A

DNA sequence of modified Env including multi-clade V3 loops [SEQ ID NO: 32]:

Atgagagtgaaggagaaaatcagcacttgtggagatgggggtggagatggggcaccatgtccttggat
gttgcgtatctgttgtctacagaaaaatgtgggtcacagtctattatgggtacctgtgtggaaaggaaag
caaccaccactctatgtcatcagatgtctaaagcatatgatacagaggtacataatgtttggccaca
catgcgtgttacccacagaccccaaccacaagaaggatgttggataatgtgacagaaaattttacat
gtggaaaatgacatgttagaaacagatgtcatgaggatataatcagttatggatcaaagcctaaagccat
gtgtaaaattaacccactctgtgtggagctggtagttgtacacacccat

V1, V2 deletion, GAG insertion

Cattacacaggcctgtccaaaggatcccttgcgcattccatcattattgtgccccggctggtttg
cgattctaaatgtataataaagacgttcaatggacaggaccatgtacaatgtcagcacagtacaatgt
acacatggaaattaggccagtagtcaactcaactgtgttacatggcagtctggcagaagaagaggttagt
aatttagatctgcacatgttgcacagacaatgtctaaaccataatgtacagctgacaccatctgttagaaat
attgtacaagacccaacaacaa

Start of Clade B

Tacaagaaaaagtatccgtatccagagaggaccaggagagcattgttacaataggaaaataggaaata
tgagacaaggcacattgtctcggtgttaccag

Insert a AvaI site Clade A

Acctaacaacaatacaagaaaaagtgtacgtataggaccaggacaaacattctatgcaacagggtatataa
tagggatataagacaaggcacattgttgc

Clade C

Gagacccaacaataatacaagaaaaagtataaggataggaccaggacaaggcattctatgcaacaggagaaa
taataggatataagacaaggcacattgttgc

Clade D

Cacaaggccctacaacaataagacaaaaggacccataggactaggcaaggcactctataacaagaaa
gaatagaagatataagaagacacattgttgc

Clade E

Taccagaccctccaccaatacaagaacaatgtataggaccaggacaaggatattctatagaacaggag
acataacaggatataagaaaagcatattgtggatctgttacaagacccaacaatacaagaaaaaga
atatttttagg

BamHI clade F

Accaggacgagtatttatacagcaggagaaaataataggagacatcagaaaggcacattgttgc
ctaataacaatacaagaaaaagtataactt

Clade G

Tgcaccaggacaaggcgtctatgcaacagtgttacataggagatataagacaaggcacattgtctcgga
acatttagtagagccaaatggataacactt

Insert a AvaI

Aaaacagatagatagccaaatataagagaacaatttggaaataataaaaacaataatcttaagcagtctcag
gagggggacccagaaaattgttaacgcacagttttaattgtggggaaattttctactgttaattcaacacaa
ctgtttaatagtacttgggttaatagtacttggagtactaaagggtcaaataacactgaaggaaatgtacac
aatcaccctccatgcagaataaaaacaattataacatgtggcaggaagttagaaaagcaatgtatgccc
ctcccatcagtggacaaatttagatgttcatcaaataattacaggcgtcttataacaagagatgggttaat
agcaacaatgtggcagatcttcagacctggaggaggatatgggacaattggagaagtgttaattata
taaatataaaatgttagtataattgtggatggatggatgtggcacaaggcaagagaagatgtggcaga
ctatgtcgtgg

Cleavage site mutation (SpeI)

Aataggagcttgccttgggtcttggggcagcagcggcggcggcggcggcggcggcggcggcggcggc
cggtacaggccagacaatttgcgttgtatgtgcggcggcggcggcggcggcggcggcggcggcggc
caacacgtctgttgcactcacagtctggggcatcaagcggcggcggcggcggcggcggcggcggc
atacctaaaggatcaacacagctccctggggattttgggttgcgtctggaaaactcatttgcaccactgtgtgc
cttggaaatgtctgtggatgttgcgttgttgcgttgttgcgttgttgcgttgttgcgttgttgcgttgttgc
agagaaaattaaacaattacacaagcttaatacactccttaattgtggatgtggatgtggatgtggatgtgg
tgaacaagaattatgtggatgtggatgtggatgtggatgtggatgtggatgtggatgtggatgtggatgtgg
gttataaaaatgtggatgtggatgtggatgtggatgtggatgtggatgtggatgtggatgtggatgtgg
ctgtga

GPI anchor

FIGURE 49B

Amino acid sequence of modified Env including multi-clade V3 loops [SEQ ID NO: 33]:

G V C H T I C V L T N N R A C T T F R Y S T P T N T R F I Q N N I S W A A M N W D A N H L L Q
W W F T V D L K I S L D T R G Q C A T L P R R Y P A S Q E T N I Q N N V G S Q V K T N I L W L
R L A N E P P A V L T C G L G C Q C A R Y T F R Y I E P S S I G G D G I A Q T L T W L E N L
W K T W V H T C F N L F N P C P H G C Q T F C V T L N R D N G O S G R L G A Q L Y C I S Q T S
G E T V L M L A G T Q N I G H G A P H G C V S R C A G L G C K K I D M P V G V Q R I Q T E I L
W T T N V Q K Q A C T A E R A I Q G A L C Q G G C Q L K G Y T I P R D E A M I L E L E Y N N S
R A A H V E V T P P S S V Q Q R R I Q G H G C P H G C S S F S R P T G I S T G L V K L N K F L
W S E V E V C I A G V R S I R V I R R I A P Y G A P H D S F W C A L G K T S S H A G S N E W L
L C K E Q M P V C T V I Q R M S D I I P R G A L K A A I Q E T P Y L G V Q G L Q L S K I Q N L
H I W T P D K S Y G P V N I N K G S D T R I K S R F Q Q K G S L M L P V V A L Q I C N E Q W L
Q M V D N N L T H N R V L S G R I K G R I R R I T R K F G N T A G R K V A Q A R G S R N L L *
Y L P Y P K S N I F I E Q K I T I R I Q D I I R D I I L I C F I K T F Y R G R E A W W D Q S L L
K M V A D W Q C P T G E V R K N D T I R E S D K G S D T I N W T G I I K R L A I Q I S W S A W S
E G G K T M D S I K H E I T G N G N E I I T G R I K G N T F T D V N E Y K F Q A L G A E E W S M
V L Y D V F L A E N C L T N T P A N T N R R T I N E T I W N H N G Q S E E K L T L K L W W I D I D
R M V S C N S G F C Q S K N V R Y P A Y T N D N G N E K N T F E W C N S T F L L I Q P T L L Y T
M T T A A E I V S K V G A P F T F R Y P T T G N A N G A G V L T M R N R P L T N G Q V M S E W A

FIGURE 50A

1. DNA sequence of p17/24 in natural form [SEQ ID NO: 34]:

atgggtgcagagcgtcagtattaagcggggagaattagatcgatggaaaaattcggttaaggccagg
ggaaagaaaaataataataaaacatataatgtatggcaagcaggagctagaacgattcgcagttaatc
ctggctgttagaaacatcagaaggctgttagacaatataactgggcacagctacaaccatcccttcagacagga
tcagaagaactttagatcattataatacactgttagcaacccttattgtgtcatcaaaggatagagataaa
agacccaacggaaagctttagacaatataactgttagcaacccttattgtgtcatcaaaggatagagataaa
cagctgacacaggacacagcagtcaggcagccaaaattaccctatactgtgcagaacatccaggggcaatg
gtatcatcaggccatatacaccctagaactttaaatgcattgtgtgtaaaatgttagtgcagaacatccaggggcaatg
agaagtaataaccatgtttcagcattatcagaaggccacccacaagattaaacaccatgctaaaca
cagtgggggacatcaagcagccatgcataatgtttaaatggacatcaatggaaagcataatggat
agagtacatccagtcagtcaggcctattgtcaccaggccagatggacatggaaagcataatggat
aggaactacttagtacccttcaggaacaaataggatggatgcacaaataatccacccatccaggtaggagaaa
tttataaaagatggataatcctggattaaataaaatgttagaataatgtatagccctaccaggcattctggac
ataagacaaggacaaaagaacccctttagagactatgttagccgttataaaactctaagagccgagca
agcttcacaggaggtaaaaattggatgcacaaaaccccttgggtccaaatgtgcacccagattgtaa
ctatttaaaagcattgggaccagcggctacactagaagaaatgtacatgggatggatggag
ccggccataaggcaagatggtaaaatggtaaa

2. DNA sequence of p17/24 in secreted form [SEQ ID NO: 35]:

atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatgg
gp120 signal peptide
ggcacatgctccttggatgttgcattgtgtgtgcgcagagcgc
p17/p24
tcagtattaagcggggagaattagatcgatggaaaaattcggttaaggccaggggaaagaaaaata
taaattaaaacatataatgtatggcaagcaggagctagaacgattcgcagttaatcctggctgttagaaa
catcagaaggctgttagacaatatactgggcacagctacaaccatcccttcagacaggatcagaagaacttgc
tcattataatacactgttagcaacccttattgtgtcatcaaaggatagagataaaagacaccaaggac
tttagacaagatagaggaagagcaaaatgttagaataagaaaaagcacagcaagcagcagctgacacaggac
acagcagtcaggtcagccaaaattaccctatactgtgcagaacatccaggggcaatggatcatcaggccata
tcaccttagaactttaaatgcattgtgtgtaaaatgttagtgcagaagagaaggcttgcagccagaagtaataaccat
gttttcagcattatcagaaggccacccacaagattaaacaccatgctaaacacagtgggggacatc
aagcagccatgcaatgttaaaagagaccatcaatggaaagctgcagaatggatagagatccagtg
catgcaggccattgtcaccaggccagatggacatggacatccacccatcccttgcacaggactactgtac
ccttcaggaacaaataggatggatgacaaaataatccacccatcccttgcacaggactactgtac
taatcctggattaaataaaatgttagaataatgtatagccctaccacgttgcacaggactactgtac
aaagaaacccctttagagactatgttagaccgggttataaaactctaagagccgagcaagcttgcacaggaggt
aaaaattggatgacagaaaaccccttgggtccaaatgtgcacccagattgttaagactatttaaaagcat
tgggaccagcggctacactagaagaaatgtacatgggatggatggaggaccggccataaggca
agatggtaaaatggtaaa

FIGURE 50A -continued

1. DNA sequence of p17/24 in membrane form [SEQ ID NO: 36]:

atgagagtgaaggagaatatcagcacttgtggagatgggggtggagatgg
gp120 signal peptide
Ggcaccatgccttggatgtatgtatctgttagtgcgtggcgcagagcg
P17/p24
tcagtattaagcgggggagaatttagatcgatggaaaaattcggttaaggccaggggggaaagaaaaata
taaattaaaacatataatgtatggcaagcaggagctagaacgatcgcatgttaatcttgcgtttagaaa
catcagaaggctgttagacaataactgggacagctacaaccatccctcagacaggatcagaagaacttaga
tcattatataatacagttagcaaccctctattgtgtcatcaaaggatagagataaaagacaccaaggaagc
tttagacaagatagaggaagagcaaaacaaaagtaagaaaaaagcacagcaagcagcagctgacacagagac
acagcagtcaaggcagccaaattaccctatagtgcagaacatccagggcaatggtacatcaggccata
tcacctagaactttaatgcattggtaaaatgttagtgcagaagagaaggcttcagccagaagtaataccat
gtttcagcattatcagaaggagccacccacaagattaaacaccatgctaaacacagtgggggacatc
aagcagccatgcaaatgttaaaagagaccatcaatgaggaagctgcagaatggatagatcatccatg
catgcaggccctattgcaccaggccagatgagagaaccaagggaaagtgcacatagcaggaactactatgc
ccttcaggaacaaataggatggatgacaaataatccacctatccctagtaggagaaatttataaaagatgg
taatccctggatataaaaatagaatgtatagccctaccacgcattctggacataagacaaggacca
aaagaaccttttagagactatgttagaccggcttctataaaactctaagagccgagcaagcttcacaggaggt
aaaaaattggatgacagaaaaccccttggtccaaaatgcgaaccaggatgtaaagactatttaaaagcat
tgggaccagcggctacactagaagaaaatgtacagcatgtcaggagtaggaggaccggccataaggca
agagtttg
ttatccataatgtatgttaggaggcttggtaggtttaaagaaatagttttgtactttctgtatgtaaatag
agttaggcaggatattcaccattatcggttcagaccacccacccatcccgagggtataa
gp41 transmembrane domain

FIGURE 50B

1. Amino acid sequence of p17/24 in natural form [SEQ ID NO: 37]:

M	I	A	E	E	R	N	Q	Q	A	P	Q	P	D	N	N	P	E	N	L	R
G	R	S	G	E	I	K	V	A	F	Q	M	V	I	P	K	K	Q	A	E	V
A	L	R	C	L	E	S	S	I	S	D	L	H	A	P	I	E	A	N	E	L
R	R	E	R	R	I	K	Q	S	P	L	K	A	G	I	V	P	S	P	M	*
A	P	L	Q	S	K	K	N	P	E	N	E	G	T	P	R	F	Q	D	M	
V	G	R	L	Y	T	A	P	T	I	M	I	I	S	G	Y	D	V	K	A	
L	K	F	G	N	K	Q	I	L	P	L	N	A	T	E	S	Y	K	T	C	
G	K	V	L	V	A	A	Q	A	F	T	E	G	Q	Y	T	D	W	L	G	
G	Y	N	Q	A	L	A	N	W	S	V	A	Q	E	K	S	R	M	K	V	
E	E	K	P	P	T	D	A	I	V	A	G	A	M	Q	R	I	F	T	A	G
L	L	G	S	S	L	K	D	Q	K	L	G	E	R	I	W	L	Y	E	L	G
D	D	H	L	Q	C	E	G	Q	V	E	O	D	P	W	I	I	T	L	P	G
R	R	W	I	E	T	V	E	H	M	E	G	A	R	R	M	L	R	L	A	H

2. Amino acid sequence of p17/24 in secreted form [SEQ ID NO: 38]:

W G V G R L Y T A P P P T I M I I S G Y D V A
W S G E I L D K Y Y R V T T P T V M R E T
R A P L Q S K K N N P E N E G T P R F Q M
R W R E R R I K Q Q S P L K A G I V P S M *
G A L R C L E S S S S I S D L H A P I E A E L
W G R S G E I K V V V A F Q M V I P K K Q E V
R A I A E E R N Q Q Q Q A P Q P D N N P E L R
W S K W S S Q Q S S S H K T M H S N L G A T A
R A I A E E R N Q Q Q Q A P Q P D N N P E L R
L C E V T G H E S S S V E A A V G T G Q R A K
H I W I E T V E H H H M E G A R R M L R L A H
L C E V T G H E S S S V E A A V G T G Q R A K
Q M R H L Q C E G G G Q V E Q D P W I T P G
Y L D K L L Y I T T T G V S H W E G I D K G P
K M L L G S L K D D D Q K L G E R I W L Y L G
E G E K P P T D A A A I V A G A M Q R I F A G
V L G K V L V A A A A Q A F T E G Q Y T D L G
K L G Y N Q A L A A A N W S V A Q E K S R K V
R M S K A Q T E Q Q Q V N M N E P L I P V I O
M T L K F G N K Q Q Q I L P L N A T E S Y T C

FIGURE 50B-continued

1. Amino acid sequence of p17/24 in membrane bound form [SEQ ID NO: 39]:

W S G G E I L D K Y R V T T P T V M R E C T I V P
R A P P L Q S K K N P E N E G T P R F Q D M F S L
W R R R E R R I K Q S P L K A G I V P S P M L L H
G A L L R C L E S S I S D L H A P I E A N E L V T
W G R R S G E I K V A F Q M V I P K K Q A E V A Q
R A I I A E E R N Q Q A P Q P D N N P E N L R F F
W S K K W S S Q Q S H K T M M H S N L G A Q T A V S
L C E E V T G H E S V E A A V G T G Q R V A K I L
H I W W I E T V E H M E G A R R M L R L L A H R P
Q M R R H L Q C E G Q V E Q D P W I I T L P G L S
Y L D D K L L Y I T G V S H W E G I D K T G P G Y
K M L L L G S L K D Q K L G E R I W L Y E L G V G
E G E E K P P T D A I V A G A M Q R I F T A G L Q
K L G G Y N Q A L A N W S V A Q E K S R M K V G R *
V L G G K V L V A A Q A F T E G Q Y T D W L G G V G
R M S S K A Q T E Q V N M N E P L I P V N I Q V R R
M T L L K F G N K Q I L P L N A T E S Y K T C I N P

FIGURE 51A

1. DNA sequence of p17 in natural form [SEQ ID NO: 40]:

atgggtgcagagcgtcagtattaagcggggagaattagatcgatggaaaaattcg
gttaaggccaggggaaagaaaaatataaattaaaacatatacatatggcaagcagg
agctagaacgattcgcatgttaatcctggctgttagaaacatcagaaggctgttagacaa
atactggacagctacaaccatccctcagacaggatcagaagaacttagatcattata
taatacagttagcaacccttattgtgtcatcaaaggatagagataaaagacaccaagg
aagcttagacaagatagaggaagagcaaaacaaaagtaagaaaaagcacagcaagca
gcagctgacacaggacacagcagtcaggtcagccaaaattactaa

2. DNA sequence of p17 in secreted form [SEQ ID NO: 41]:

atgagagtgaaggagaaatcagcacttgtggagatgggggtggagatgg
gp120 signal peptide
ggcaccatgctccttggatgtatctgttagtgcgtggcgcagagcg
p17
tcagtattaagcggggagaattagatcgatggaaaaattcggttaaggccagg
aaagaaaaatataaattaaaacatatacatatggcaagcaggagctagaacgattcg
cagttaatcctggctgttagaaacatcagaaggctgttagacaaatactggacagcta
caaccatccctcagacaggatcagaagaacttagatcattatataatacagttagcaac
cctctattgtgtcatcaaaggatagagataaaagacaccaaggaagcttagacaaga
tagaggaagagcaaaacaaaagtaagaaaaagcacagcaagcagcagtcagcacagga
cacagcagtcaggtcagccaaaattactaa

3. DNA sequence of p17 in membrane bound form [SEQ ID NO: 42]:

atgagagtgaaggagaaatcagcacttgtggagatgggggtggagatgg
gp120 signal peptide
ggcaccatgctccttggatgtatctgttagtgcgtggcgcagagcg
p17
tcagtattaagcggggagaattagatcgatggaaaaattcggttaaggccagg
aaagaaaaatataaattaaaacatatacatatggcaagcaggagctagaacgattcg
cagttaatcctggctgttagaaacatcagaaggctgttagacaaatactggacagcta
caaccatccctcagacaggatcagaagaacttagatcattatataatacagttagcaac
cctctattgtgtcatcaaaggatagagataaaagacaccaaggaagcttagacaaga
tagaggaagagcaaaacaaaagtaagaaaaagcacagcaagcagcagtcagcacagga
cacagcagtcaggtcagccaaaattac
ttattcataatgtatgttagggaggctgttaggttaagaatagttttgcgtactttc
tgttagtgaatagatgttaggcaggatattcaccattatcgttcagacccacccaa
tcccgagggat
aa
gp41 transmembrane domain

FIGURE 51B

1. Amino acid sequence of p17 in natural form [SEQ ID NO: 43]:

MIAEEERNO GRSGEIKV ALRCLESS RERRIKQ APLOSKN SGEILDK VGRLYTA* LKFGNQ SKAOTEQ GKVLA GYNQALA EKPTDA LLGSLKD DKLLYIT RHLQCEG WIETVESH EVTGHESS KWSQS

2. Amino acid sequence of p17 in secreted form [SEQ ID NO: 44]:

M T L K F G G N K O
R M S K A Q Q T E O
V L G K V L L V A A
K L G Y N Q Q A L A
E G E K P P P T D A
K M L L G S S L K D
Y L D K L L Y I T
Q M R H L Q O C E G
H I W I E T T V E H
L C E V T G G H E S
W S K W S S S Q O S
R A I A E E E R N Q
W G R S G E E I K V
G A L R C L L E S S
W R R E R R I K Q
R A P L Q S S K K N
W S G E I L L D K Y
G V G R L Y T A *

3. Amino acid sequence of p17 in membrane bound form [SEQ ID NO: 45]:

FIGURE 52B

1. Amino acid sequence of p24 in natural form [SEQ ID NO: 49]:

M	P	I	V	Q	N	I	G	S	V	A	F	M	P	E	N	G	T	P	R	F	Q	D	
R	T	L	N	M	F	A	G	S	V	A	M	P	P	S	L	K	A	G	I	V	P	S	M
V	T	I	M	I	E	T	E	K	P	A	M	O	R	P	D	L	H	A	P	I	V	P	*
T	T	M	I	I	A	G	G	S	V	A	A	M	O	R	N	N	M	V	I	P	S	P	
P	T	P	S	S	T	E	G	T	A	E	R	I	W	G	D	N	H	P	Q	P	F	Q	M
T	V	M	R	R	E	S	Y	T	D	R	D	I	F	T	R	M	T	L	H	A	R	F	D
E	C	D	V	K	T	E	S	Y	W	N	D	Y	W	L	Q	N	S	N	L	G	A	G	M
C	T	K	T	C	Q	L	G	G	Y	I	Q	T	I	G	Q	Q	M	N	H	S	N	S	*

2. Amino acid sequence of p24 in secreted form [SEQ ID NO: 50]:

M	R	V	K	E	M	Q	L	G	P	Q	A	F	M	P	E	N	G	T	P	R	F	Q	D
T	M	L	Q	V	E	E	A	A	V	E	A	G	M	P	P	S	L	K	A	G	I	V	*
Q	G	Q	W	S	H	E	A	A	V	E	A	G	M	P	P	S	L	K	A	G	I	V	
K	V	S	H	E	Q	D	P	Q	D	E	R	I	W	G	T	P	R	M	R	E	T	T	
L	G	W	E	E	Q	D	P	Q	D	E	R	I	W	G	T	P	R	M	R	E	T	T	
G	E	R	I	I	D	K	T	R	M	L	R	I	W	G	T	P	R	M	R	E	T	T	
R	I	W	L	Y	E	T	L	L	R	L	R	I	W	G	T	P	R	M	R	E	T	T	
K	E	E	I	D	K	T	R	M	L	R	L	R	I	W	G	T	P	R	M	R	E	T	
L	G	W	E	E	Q	D	P	Q	D	E	R	I	W	G	T	P	R	M	R	E	T	T	
G	E	R	I	I	D	K	T	R	M	L	R	L	R	I	W	G	T	P	R	M	R	E	T

3. Amino acid sequence of p24 in secreted form [SEQ ID NO: 51]:

M	R	V	K	E	M	Q	L	G	P	Q	A	F	M	P	E	N	G	T	P	R	F	Q	D
T	M	L	Q	V	E	E	A	A	V	E	A	G	M	P	P	S	L	K	A	G	I	V	*
Q	G	Q	W	S	H	E	A	A	V	E	A	G	M	P	P	S	L	K	A	G	I	V	
K	V	S	H	E	E	Q	D	P	Q	D	E	R	I	W	G	T	P	R	M	R	E	T	
L	G	W	E	E	Q	D	P	Q	D	E	R	I	W	G	T	P	R	M	R	E	T	T	
G	E	R	I	I	D	K	T	R	M	L	R	L	R	I	W	G	T	P	R	M	R	E	T
K	E	W	L	Y	E	T	L	L	R	L	R	L	R	I	W	G	T	P	R	M	R	E	T
L	G	W	E	E	Q	D	P	Q	D	E	R	I	W	G	T	P	R	M	R	E	T	T	
G	E	R	I	I	D	K	T	R	M	L	R	L	R	I	W	G	T	P	R	M	R	E	T

FIGURE 53A

**DNA sequence of modified Env including multi-clade V3 loops and Tat
[SEQ ID NO: 52]:**

Gaattctgcaacaactgctgttatccatttcagaattgggtgtcgacatagcagaataggcgt
tactcgacagaggagcaagaaatggagccagtagatccitagactagagccc

Tat1

Tggaagcatccaggaagtca~~gg~~acttgcataacaaaagccttaggc~~at~~tcctatggcaggaagaagcggagac
agc~~g~~acgaagac~~ct~~cctcaaggc~~at~~gactcatcaagttcttatcaa~~g~~ca~~g~~ta~~g~~ta~~g~~ta~~g~~
cat~~g~~taatg~~c~~aa~~c~~ctata~~c~~aa~~t~~ag~~c~~aa~~t~~ag~~t~~g~~c~~att~~t~~at~~g~~ca~~a~~ta~~a~~ta~~g~~ca~~a~~ta~~g~~
t~~g~~t~~g~~tg~~t~~ccat~~g~~ta~~a~~at~~c~~at~~g~~aa~~t~~at~~g~~aa~~a~~at~~t~~ta~~a~~ag~~c~~aa~~a~~ag~~a~~aa~~t~~ag~~c~~ag~~g~~tt~~aa~~
tt~~g~~at~~g~~act~~a~~at~~g~~aa~~a~~ag~~g~~g~~c~~aga~~g~~ac~~g~~t~~g~~ca~~at~~g~~g~~ag~~t~~g~~a~~agg~~g~~aa~~a~~at~~t~~c~~g~~c~~a~~ct~~t~~
gtggagatgggggtggagatggg

Envelope

Gcaccatgctcc~~t~~ggat~~g~~ttgat~~g~~t~~g~~t~~g~~ctacagaaaaattgtgggtcacagtctat
tat~~g~~gggtac~~c~~t~~g~~t~~g~~ga~~g~~ga~~a~~ag~~c~~aa~~c~~cc~~a~~c~~ct~~ct~~at~~tttgc~~at~~cat~~g~~ctaa~~g~~cata
tgatac~~a~~gagg~~t~~acataat~~g~~tt~~g~~ggccac~~a~~c~~at~~gc~~c~~t~~g~~t~~g~~ta~~cc~~ac~~ag~~ac~~cc~~ca~~cc~~c~~a~~ag
a~~g~~tag~~t~~at~~g~~gta~~a~~at~~g~~gac~~g~~aaaaat~~t~~ta~~a~~cat~~g~~tg~~g~~aaaaat~~g~~ac~~at~~g~~g~~ta~~a~~ac~~g~~at~~g~~
cat~~g~~agg~~at~~ata~~a~~at~~c~~ag~~tt~~at~~g~~ggat~~c~~aa~~g~~c~~ct~~aa~~g~~c~~at~~g~~g~~t~~g~~ta~~aa~~at~~t~~ta~~ac~~cc~~c~~act~~t~~g
t~~g~~t~~g~~gag~~c~~t~~g~~g~~t~~at~~t~~g~~t~~ta~~a~~c~~a~~c~~c~~t~~ca~~

Delete V1V2, insert Gly, Ala, Gly

gtcattacacaggcc~~t~~gtccaa~~g~~gttat~~c~~tt~~g~~g~~c~~caat~~cc~~cata~~c~~attatt~~t~~gcccc~~g~~
tgg~~ttt~~gc~~at~~tctaaaat~~g~~taataa~~g~~ac~~g~~t~~ca~~at~~g~~ga~~a~~c~~agg~~acc~~at~~g~~t~~aca~~a~~at~~g~~t~~ca~~
gcac~~a~~g~~t~~aca~~a~~at~~g~~t~~ac~~ac~~at~~g~~g~~aa~~t~~tag~~g~~cc~~ag~~t~~ag~~t~~at~~ca~~a~~ct~~g~~ct~~g~~t~~ta~~at~~g~~g~~c~~ag~~t~~
ct~~g~~g~~c~~aga~~a~~ag~~g~~g~~t~~ag~~t~~ta~~a~~tt~~g~~at~~c~~g~~cc~~aa~~t~~tc~~ac~~ag~~a~~ca~~t~~g~~c~~ta~~aa~~acc~~c~~ata~~a~~at~~g~~t
ac~~a~~g~~t~~g~~a~~ac~~ca~~at~~c~~g~~t~~ta~~g~~aa~~t~~ta~~g~~

First multi-clade repeat

A~~cc~~caacaacaata~~a~~agaaaaat~~c~~ccgtat~~c~~cagagaggaccaggag~~g~~ac~~tt~~gtt~~ac~~aa
tag~~g~~aaaaat~~a~~g~~g~~aa~~a~~at~~t~~g~~g~~aca~~g~~ca~~c~~att~~t~~g~~t~~c~~gg~~gt~~t~~acc~~g~~ac~~g~~cta~~a~~aca~~a~~at~~a~~
agaaaaat~~g~~t~~ac~~gtat~~g~~ag~~g~~acc~~g~~gaca~~a~~ac~~c~~att~~t~~ct~~at~~g~~c~~aa~~c~~ag~~g~~t~~at~~ata~~a~~ag~~g~~g~~g~~at~~at~~
a~~g~~aca~~a~~g~~c~~ac~~c~~att~~t~~g~~t~~ta~~c~~g~~g~~aca~~g~~cc~~a~~ata~~a~~at~~c~~aca~~g~~aaaaat~~g~~t~~at~~ata~~a~~agg~~at~~agg~~g~~acc~~g~~
g~~a~~aca~~g~~c~~at~~t~~ct~~at~~g~~ca~~ac~~agg~~g~~aa~~a~~ata~~t~~agg~~g~~at~~at~~ag~~g~~aca~~g~~ac~~c~~att~~t~~g~~t~~ca~~c~~aa~~g~~agg~~g~~
cc~~c~~t~~a~~aca~~a~~at~~t~~ata~~a~~ag~~g~~aca~~g~~ccccat~~g~~agg~~g~~act~~g~~agg~~g~~ca~~g~~act~~ct~~tata~~a~~aca~~a~~ag~~g~~
a~~at~~ag~~g~~at~~t~~ata~~a~~ag~~g~~aca~~g~~cat~~g~~t~~tt~~acc~~g~~ac~~g~~at~~at~~aca~~g~~aca~~g~~at~~at~~ata~~a~~
gt~~t~~at~~g~~agg~~g~~acc~~g~~aca~~g~~at~~t~~t~~c~~t~~at~~aga~~a~~ac~~g~~agg~~g~~aca~~g~~ata~~c~~agg~~g~~at~~at~~ata~~a~~ag~~g~~aa~~a~~g~~c~~at~~at~~
t~~g~~t~~g~~g~~t~~at~~c~~ct~~g~~t~~ca~~ag~~g~~cc~~a~~aca~~a~~at~~c~~aca~~g~~aaaaat~~g~~at~~at~~t~~tt~~agg~~g~~acc~~g~~agg~~g~~ac~~g~~at~~at~~
at~~ttt~~tata~~c~~ag~~g~~g~~g~~aa~~a~~ata~~t~~agg~~g~~ag~~g~~ac~~at~~c~~g~~aaa~~g~~agg~~g~~ca~~at~~t~~g~~t~~g~~acc~~g~~ac~~ct~~ta~~a~~
aca~~a~~ata~~a~~ag~~g~~aaaaat~~g~~t~~at~~tt~~g~~c~~ac~~c~~g~~agg~~g~~aca~~g~~ag~~g~~cg~~ct~~t~~at~~g~~c~~aa~~c~~ag~~g~~t~~aa~~ata~~a~~

Second multi-clade repeat

Caagaaaaat~~g~~t~~ac~~gtat~~g~~agg~~g~~aca~~a~~ac~~c~~att~~t~~ct~~at~~g~~c~~aa~~c~~ag~~g~~t~~g~~at~~at~~ata~~a~~ag~~g~~g~~g~~at~~at~~
ata~~g~~aca~~a~~g~~c~~ac~~c~~att~~t~~g~~t~~ta~~c~~g~~g~~aca~~g~~cc~~a~~ata~~a~~at~~c~~aca~~g~~aaaaat~~g~~at~~at~~ata~~a~~agg~~at~~agg~~g~~acc~~g~~
agg~~g~~aca~~a~~g~~c~~att~~t~~ct~~at~~g~~c~~aa~~c~~agg~~g~~aa~~a~~ata~~t~~agg~~g~~at~~at~~ag~~g~~aca~~g~~ac~~c~~att~~t~~g~~t~~ca~~c~~aa~~g~~agg~~g~~
gg~~c~~c~~t~~aca~~a~~at~~t~~ata~~a~~ag~~g~~aca~~g~~ccccat~~g~~agg~~g~~act~~g~~agg~~g~~ca~~g~~act~~ct~~tata~~a~~aca~~a~~ag~~g~~
aga~~at~~ag~~g~~at~~t~~ata~~a~~ag~~g~~aca~~g~~ac~~c~~att~~t~~g~~t~~ta~~c~~g~~g~~aca~~g~~cc~~c~~t~~cc~~aca~~a~~ata~~a~~aca~~g~~at~~at~~
ac~~g~~t~~at~~agg~~g~~acc~~g~~aca~~g~~at~~t~~t~~c~~t~~at~~aga~~a~~ac~~g~~agg~~g~~aca~~g~~ata~~c~~agg~~g~~at~~at~~ag~~g~~aa~~a~~g~~c~~at~~at~~
at~~t~~g~~g~~g~~t~~at~~c~~ct~~g~~t~~ca~~ag~~g~~cc~~a~~aca~~a~~at~~c~~aca~~g~~aaaaat~~g~~at~~at~~t~~tt~~agg~~g~~acc~~g~~agg~~g~~ac~~g~~at~~at~~
gt~~t~~at~~ttt~~tata~~c~~ag~~g~~g~~g~~aa~~a~~ata~~t~~agg~~g~~ag~~g~~ac~~at~~c~~g~~aaa~~g~~agg~~g~~ca~~at~~t~~g~~t~~g~~acc~~g~~ac~~ct~~ta~~a~~
ta~~aca~~ata~~a~~ag~~g~~aaaaat~~g~~t~~at~~tt~~g~~c~~ac~~c~~g~~agg~~g~~aca~~g~~ag~~g~~cg~~ct~~t~~at~~g~~c~~aa~~c~~ag~~g~~t~~aa~~ata~~a~~

FIGURE 53A-continued

taggagatataagacaaggcacattgtctcgaacatttagtagagcaaaatgaaataaacactt
AvaI site, end of two multi-clade repeat
Aaaacagatagatagcaaattaagagaacaatttggaaataataaaacaataatcttaagcagt
cctcaggaggggaccaggaaattgtaacgcacagttaattgtggagggaaattttctactgt
aattcaacacaactgttaatagtacttggtaatagtacttggagttactaaagggtcaaataa
caactgaaggaagtgacacaatcaccctccatgcagaataaaacaattataaacatgtggcagg
aagttaggaaaagcaatgtatgcccctccatcagtggacaatttagatgttcatcaaatttaca
gggctgttattaaacaagagatggtaatagcaacaatgagtccgagatcttcagacctggagg
aggagatattgaggacaatttggaaagtgaatttataatataaagttagtataaaattgaaccat
taggatgtacccaccaaggcaaagagaagagtggcagactgtgcagttggaaataggagct
ttgtcccttgg

Delete the cleavage site, insert SpeI site
gttcttgggagcagcaggaaggcacatggcgccgcgtcaatgacgctgacggcacggccagac
aattattgtctgttatagtgcagcagcagaacaatttgcgtggctattgaggcgcaacagcat
ctgttgcactcacatgtctgggcatcaaggcagctccaggcaagaatccgtggaaagata
cctaaaggatcaacacagctctgggatttgggtgcattggaaaactcattgcaccactgctg
tgccttggatgtctgttggagtaataatctctggaaacagatttggaaataacatgacctggatg
gagtgggacagagaaaatttacaattacaagcttaataactccttaatttgaagaatcgcaaaa
ccagcaagaaaagaatgaacaagaatttggaaatttagataatggcaagtttggaaatttgg
ttaacataacaaatttggctgtgttatataaaatttattcataatgtatgttaggaggcttggtaggt
ttaagaatagttttgtactttctgttagtgaatagatgttaggttaggcaggatattcaccattatc
gtttcagacccacccatccatcccggggacccgcacaggcccgaaggaaatagaagaaggatg
gagagagagacagacagatccattcgatttagtgaacggatccttagcacttatctggtaa

gp41, delete the 300 bp at C-terminal

FIGURE 53B

Amino acid sequence of modified Env including multi-clade V3 loops and Tat
[SEQ ID NO: 53]:

G V C H T I C V L T N N R A C T T F R Y S T P T N T P A N T N R T I N E T I W N H N G Q S E E K L T L K L W W I D I A E A
W W F T V D L K I S L D T R G Q C A T L P R R Y P A R Y P A Y T N D N G N E K N T F E W C N S T F L L I Q P T L L Y F E L
R L L A N E P P A V L T C G L G C Q C A R Y T F R Y P T T G N A N G A G V L T M R N R P L T N G Q V M S E W V E S
W K T W V H T C F N L F N P C P H G C Q T F C V T L C T T F R Y S T P T N T R F I Q N N I S W A M N W D A N H L I I G
G E T V L M L A G T Q N I G H G A P H G C V S R C A G Q C A T L P R R Y P A S Q E T N I Q N N V G S Q V K T N I L W R G N
W T T N V Q K Q A C T A E R A I Q G A L C Q G G C Q L G C Q C A R Y T F R Y I E P S S I G G D G I A Q T L T W L E N L E V
R A A H V E V T P P S S V Q Q R R I Q G H G C P H G C P H G C Q T F C V T L N R D N G Q S G R L G A Q L Y C I S Q T G P L
W S E V E V C I A G V R S I R V I R R I A P Y G A P H G C V S R C A G L G C K K I D M P V G V Q R I Q T E I V R R
L C K E Q M P V C T V I Q R M S D I I P R G A L K A A I Q G A L C Q G G C Q L K G Y T I P R D E A M I L E L E Y N N L D I
H I W T P D K S Y G P V N I N K G S D T R I K S R F Q R R I Q G H G C P H G C S S F S R P T G I S T G L V K L N K F G P S
Q M V D N N L T H N R V L S G R I K G R I R R I T R V I R R I A P Y G A P H D S F W C A L G K T S S H A G S N E W G G R
Y L P Y P K S N I F I E Q K K I T I R I I Q D I I I R D I I I S D I I P R G A L K A A I Q E E T P Y L G V Q G L Q L S K I O N V R D
K M V A D W Q C P T G E V R K N D T I R E S D K G S D T R I K S R F Q Q K G S L M L P V V A L Q I C N E Q W I P R
E G G K T M D S I K H E I T G N G N E I I T G R I K G R I R R I I T R K F G N T A G R K V A Q A R G S R N L M I D
K L Y A P N W G P N T A I N I N T N G N R R T T I R I I Q D I I I R D I I I L I C F I K T F Y R G R E A W W D Q S I P R *
V L Y D V F L A E N C L T N T P A N T N R T I N E T I N D T I R E S D K G S D T I N W T G I I K R L A I Q I S W S A F L E W
M T T A A E I V S K V G A P F T F R Y P T T G N A N G N T N G N E I I T G R I K G N T F T D V N E Y K F Q A L G A E E W L H G I
L

FIGURE 54A

DNA sequence of modified Env including multi-clade V3 loops, Tat and Rev [SEQ ID NO: 54]:

Tat1

tggaaagcatccaggaagtca^gctaaaactgcttgcatttgcattgtaaaaagtg
ttgctttcattgccaagttgtttcataacaaaaggccttaggcattcct**atgg**cagga
Pov1

Rev 1

agaagcggagacagcagcaagacacctcctcaaggcagtcagactcatcaagttctcta
tcaaaggcagtaagttagtacatgtaatgcaacctatacaaatacgcaatagtagcattag
agtagcaataataatagcaatagttgtgtggccatagtaatcatagaatataggaaaa
tattaagacaaagaaaaatagacaggttaattgatagactaatagaaaagagcagaagac
agtggcaatgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatggg

Envelope

Gcaccatgctccttggatgttcatgtatctgttagtgcatacagaaaaattgtgggtcaca
gtctattatgggtacctgtgtggaaaggaaggcaaccaccactctatttgtgcatacaga
tgctaaagcatatgatacagaggtacataatgtttggccacacatgcctgttaccca
cagaccccaacccacaagaagtagtattggtaatgtgcacagaaaaatttaacatgtgg
aaaaatgacatggtagaacagatgcattggatataatcagttatggatcaaagcct
aaagccatgtgtaaaattaacccactctgtttggagctggtagttgtaacacactca

Delete V1V2, insert Gly,ala,gly

gtcattacacaggcctgtccaaaggatccttgagccaaattccatacattatttgtc
cccgctggtttgcattctaaaatgtataataagacgttcaatggAACAGGACCAT
gtacaaatgtcagcacagtacaatgtacacatggatttaggcAGTAGTATCAACTCAA
ctgctgttaatggcagtcggcagaagaAGAGGTAGTAATTAGATCTGCCAATTTCAC
agacaatgctaaaaccataatagtacagctgaaccaatctgtAGAAATTATGtacaa
g

First multi-clades repeat

Acccaacaacaatacagaaaaaagtatccgtatccagagaggaccaggagagacatttg
ttacaataggaaaaatagggaaatatgagacaagcacattgtctcggtgtaccagacct
aacaacaatacagaaaaaagtgtacgtataggaccaggacaaacattctatgcaacagg
tgatataatagggataataagacaaggcacattgttgcatacagggaccaacaataataca
aaaaaagtataaggataggaccaggacaaagcattctatgcaacaggagaaaataatagga
gatataagacaaggcacattgttgcacaaggccctacaacaataatagaacaaaggacccc
cataggacttagggcaagcactctatacacaacaagaagaatagaagatataagaagagcac
attgttgcatacagggacccctccaccaatacagaacaagtatacgtataggaccaggacaa
gtattctatagaacaggagacataacaggagatataagaaaagcatattgtggatcctg
tacaagacccaacaacaatacacaagaaaaaagaatatctttaggaccaggacgagtatttt
atacagcaggagaaaataataggagacatcagaaaggcacattgttgcatacagggaccta
aacaatacagaaaaaagtataactttgcaccaggacaaagcgctctatgcaacagggtga
aataataaggagatataagacaaggcacattgttgcgggtgtaccagacctaacaacaata

Second multi-clade repeat

caagaaaaagtgtacgtataaggaccaggacaaacattctatgcaacaggtgatataata
qqqqatataaagacaagcacattgttacgagacccaacaataatacagaaaaaagtat

FIGURE 54A-continued

aaggataggaccaggacaaggcattctatgcaacaggagaataataggagatataagac
aagcacattgtgcacaaggccctacaacaatataagacaaggaccccataggacta
gggcaagcactctataacaacaagaagaatagaagatataagaagagacatgttgtac
cagacctccaccataacaagaacaagtatacgtataggaccaggacaagtattctata
gaacaggagacataacaggagatataagaaaagcatattgtggatctgtacaagaccc
aacaacaatacaagaaaaagaatatctttaggaccaggacgagtttatacagcagg
agaaaataataggagacatcagaaaggcacattgtgtaccagacctaataacaatacaa
gaaaaagtataactttgcaccaggacaaggcgtctatgcaacaggtgaaataatagga
gatataagacaaggcacattgtctcgaaaacattagtagagcaaaatggaataacacttt

AvaI site, end of two multi-clade repeat

Aaaacagatagatacgaaattaagagaacaattggaaataataaaaacaataatctta
agcagtccctcaggaggggacccagaaattgtaacgcacagtttaattgtggaggggaa
tttttctactgttaattcaacacaactgtttaatagtacttggtttaatagtacttggag
tactaaagggtcaaataaacactgaaggaagtgacacaatcaccctccatgcagaataa
aacaattataaacatgtggcaggaagttagaaaaagcaatgtatccccatcagt
ggacaatttagatgttcatcaaattacaggctgtctattaacaagagatggtgtaa
tagcaacaatgagtccgagatcttcagacctggaggaggagatatgagggacaattgga
gaagtgaattataaataaagttagtaaaaattgaaccatttagagtagcaccacc
aaggcaaaagagaagagtggcagactagtgcagtggaaataggagcttggcttgg

Delete the cleavage site, insert SpeI

gttcttgggagcagcaggaagcaactatgggctgcacgtcaatgacgctgacgggtacagg
ccagacaattattgtctgatatagtgcagcagcagaacaatttgctgagggctattgag
gcgcaacagcatctgtgcaactcacagtctgggcatcaaacagctccaggcaagaat
cctggctgtggaaagataactaaaggatcaacagctcctgggatttgggttgcctg
aaaaactcattgcaccactgctgtgccttggaatgctagttggagtaataaatctctg
gaacagatttggataacatgacctggatggagtggacagagaattaacaattacac
aagcttaatacactccttaattgaagaatgcacaaaccagcaagaaaagaatgaacaag
aattattggattagataaatggcaagtttggattttttaaacataacaaattgg
ctgtggtatataaaaatttattcataatgatagtagggggcttggtaggtttaagaatagt
ttttgctgtactttctatagtgaaatagagtttaggcaggatattcaccattatcgttc
agacccacctcccaatcccgggggacccgacaggcccgaaggaatagaagaagaagg
ggagagagagacagagacagatccattcgattagtgaacggatccttagcacttatctg
ggacgatctgcggagcctgtgcctttcagctaccaccgcttggagagacttactcttga
ttgttaacgaggattgtggacttctggacgcaggggggtggaaagccctcaaataattgg
tggaatctcctacagtattggagtcaagaaatagtgctgttaacttgctcaa
tgccacagccatagcagtagctgagtaa

gp41, but 99 bp truncation at C-terminal

FIGURE 54B

Amino acid sequence of modified Env including multi-clade V3 loops, Tat and Rev
[SEQ ID NO: 55]:

M R V K E G K T M D S I K H E I T G N G N E I I T G R I K G R I R I R I T I R I Q D I I R D I I S D I I P R G A L K A A I Q E T P Y L G V Q G L Q L S K I Q N V R R D R T W L H I W T P D K S Y G P V T V I Q R M S D I I P R G A L K A A I Q G A L C Q G G C Q L K G Y T I P R D E A M I L E L E Y N N L Q D I C V L T Q M V D N N L T H N R V L S G R I K G R I R I I T R V I R R I A P Y G A P H D S F W C A L G K T S S H A G S N E W G V G R S R N N Y L P Y P K S N I F I E Q K I T I R I Q D I I R D I I S D I I P R G A L K A A I Q E T P Y L G V Q G L Q L S K I Q N V R R D R T W L K M V A D W Q C P T G E V R K N D T I R E S D K G S D T R I K S R F Q Q K G S L M L P V V A L Q I C N E Q O W I N P R L V W L R L L A N E P P A V L T C G L G C Q C A R Y T F R Y P T T G N A N G A G V L T M R N R P L T N G Q V M S E E W V S E S R R E E W K T W V H T C F N L F N P C P H G C Q T F C V T L C T T F R Y S T P T N T R F I Q N N I S W A A M N W D A N H L L I L I G H R Q A G E T V L M L A G T Q N I G H G A P H G C V S R C A G Q C A T L P R R Y P A S Q E T N I Q N N V G S Q V K T N I L W R P G N Y G S V W T T N V Q K Q A C T A E R A I Q G A L C Q G G C Q L G C Q C A R Y T F R Y I E P S S I G G D G I T Q T L T W L E N L S E V S L W A R A A H V E V T P P S S V Q Q R R I Q G H G C P H G C P H G C P H G C Q T F C V T L N R D N G Q S G R L G C Q L Y C I S Q T G Y P L F L Y I W S E V E V C I A G V R S I R V I I R R I A P Y G A P H G A P H G C V S R C A G L G C K K I D M P V G V Q R I Q T E I V G R R L E Q A L C K E Q M P V C T V I Q R M S D I I P R G A L K A A I Q G A L C Q G G C Q L K G Y T I P R D E A M I L E L E Y N N L Q D I C V L T H

FIGURE 55A

DNA sequence of HIV-1 (strain BH10) Protease (PI, nt 1407-1907) [SEQ ID NO: 56]:

atgttcttagggaaagatctggccctacaaggaaaggccaggaaattttcttcagagcagaccagagcca
acagccccaccatttttcagagcagaccagagccaaacagccccaccagaagagagacttcaggctgggg
agagacaacaactccccctcagaagcaggagccgatagacaaggaactgtatccttaactccctcagatc
actcttggcaacgaccctcgtcacaataaaagataggggggcaactaaaggaaagcttattagatacagga
gcagatgatacagtattagaagaaatgagtttgcaggaagatggaaaccaaaaatgatagggggaaattgg
aggtttatcaaagtaagacagtgatgatcagatactcatagaaatctgtggacataaagctataggtacagtatt
atggaaacctacacctgtcaacataattggaaagaaatctgttgactcagattggttgcactttaattttaa

FIGURE 55B

Amino acid sequence of HIV-1 (strain BH10) Protease (PI) [SEQ ID NO: 57]:

FIGURE 56A

DNA sequence of HIV-1 (strain BH10) Gag-PI [SEQ ID NO: 58]:

Atgggtgcagagcgtcagtattaagcggggagaatttagatcgatggaaaaattcg
gttaaggccaggggaaagaaaaatataaattaaaacatataatgtatggcaagcaggg
agctagaacgattcgcgatcataatccctgcctgttagaaacatcagaaggctgttagacaa
atactggacagctacaaccatccctcagacaggatcagaagaacttagatcattata
taatacagtagcaacccttattgtgtcatcaaaggatagagataaaagacaccaagg
aagcttagacaagatagaggaagagcaaaacaaaagtaagaaaaaagcacagcaagca
gcagctgacacaggacacagcagtccaggtcagccaaattaccctatgtcagaacat
ccagggcaaatggtacatcaggccatatcacctagaactttaatgcattggtaaaag
tagtagaagagaaggcttcagccagaagtaataccatgtttcagcattatcagaa
ggagccaccccaacaagattnaacaccatgctaaacacagtgccatcaagcagc
catgcaaattttaaaagagaccatcaatgaggaagctgcagaatggatagatc
cagtgcattgcaggccattgtcaccaggccagatgagagaaccaaggaaagtgcata
gcaggaactacttagtacccttcaggaacaaataggatggatgacaataatccac
cccagtaggagaaatttataaaagatggataatcctggattaaataatagtaagaa
tgtatagccctaccagcattctggacataagacaaggacaaaagaaccttttagagac
tatgttagaccgggttctataaaactctaagagccgagcaagcttcacaggaggtaaaaaa
ttggatgacagaaaccccttgggtccaaatgcgaacccagattgttaagactatttaa
aagcattgggaccagcggctacactagaagaaatgtacgatgcagcatgtcaggagtagga
ggaccggccataaggcaagagtttgcattgttgcagcaatgagccaaatgc
taccataatgtgcagagaggcaatttttaggaacaaagaaatgttgcattttca
attgtggcaaagaaggccacacagccagaaattgcaggccccttagaaaaaggctgt
tggaaatgtggaaaggacacccaaatgaaagatgtactgagagacaggctaaattt
~~cttttagggaaagatctggccttcataaggaaaggccaggaaattttcttcagagcaga~~
ccagagccaaacagccccaccatttcagagcagaccagagccaaacagccccaccaga
agagagcttcaggtctgggttagagacaacaactccctcagaagcaggagccatag
acaaggaaactgtatccttaacttccctcagatcactttggcaacgcaccctcgta
caataaagatagggggcaactaaaggaaagcttattagatacaggagcagatgataca
gtattagaagaaatgatgttgcaggaatggaaacaaaatgatagggggattgg
aggttttatcaaagtaagacagtatgtatcagataactcatagaaatctgtgacataaag
ctatacgatgttgcactttaattttaaactcagattgggtgcactttaattttaa

FIGURE 57

Primers for multi-clade V3 loops:

Clade A: (1). forward primer A888F5 [SEQ ID NO: 60]:

5'-aaa tca acc gga att gaa ttc cct ggg gtg tac cag acc taa caa caa tac-3'
EcoRI AvaI

(2). reverse primer A-CR3 [SEQ ID NO: 61]:

5'-att gtt ggg tct cgt aca aca atg tgc ttg tct tat atc ccc-3'

Clade C: (3). forward primer A-CF5 [SEQ ID NO: 62]:

5'-ggg gat ata aga caa gca cat tgt acg aga ccc aac aat ac-3'

(4). reverse primer C980R3 [SEQ ID NO: 63]:

5'-gtt gta ggg cct tgt gca aca atg tgc ttg tct tat atc -3'

Clade D: (5). forward primer D888F5 [SEQ ID NO: 64]:

5'-gat ata aga caa gca cat tgt tgc aca agg ccc tac aac-3'

(6). reverse primer D-ER3 [SEQ ID NO: 65]:

5'-gtt gga ggg tct ggt aca aca atg tgc tct tct tat -3'

Clade E: (7). forward primer D-EF5 [SEQ ID NO: 66]:

5'-ata aga aga gca cat tgt tgt acc aga ccc tcc acc-3'

(8). reverse primer E998R3 [SEQ ID NO: 67]:

5'-gta ttg ttg ttg ggt ctt gta caa caa tat gct ttt ctt ata tct cc-3'

Clade F: (9). forward primer F888F5 [SEQ ID NO: 68]:

5'-gga gat ata aga aaa gca tat tgt tgt aca aga ccc aac aac aat ac-3'

(10). reverse primer F-GR3 [SEQ ID NO: 69]:

5'-gtt att agg tct ggt aca aca atg tgc ctt tct gat gtc-3'

Clade G: (11). forward primer F-GF5 [SEQ ID NO: 70]:

5'-gac atc aga aag gca cat tgt tgt acc aga cct aat aac-3'

(12). reverse primer G989R3 [SEQ ID NO: 71]:

5'-aat aaa cta gtc tag acc ccc gag tct aga aca atg tgc ttg tct tat atc tcc-3'

AvaI XbaI